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## SUGAR BEET INVESTIGATIONS IN 1897.

BY A. D. SELBY AND L. M. BLOOMFIELD.

In response to increased interest in sugar beet culture, especially in relation to the production of beets sufficiently rich in sugar to warrant the establishment of beet sugar factories in the State, it was announced early in the year that the Chemical Department of the Ohio Experiment Station would analyze samples of sugar beets grown in Ohio. Seed was furnished by the United States Department of Agriculture and distributed by Secretary W. W. Miller, of the State Board of Agriculture. Nine hundred and twenty-six packages were sent out in this way. Obtaining seed through this channel, from other distributing agencies, notably two or three fertilizer companies, and by direct purchase of their own local associations, the farmers of northern and central Ohio engaged freely in the cultivation of small, trial plots of sugar beets. These plots were for the most part of about one-eighth acre or less in area. Many were planted rather late, while the seed used frequently proved of inferior vitality and of inferior purity as well. The first named inferiority gave, for some, a poor stand and a few overgrown beets; the second, a product of various colors and with a low sugar content. The soils upon which the beets were planted were of great variety. The character is stated in the table wherever it was reported to us. The cultivation given shows wide variation and the tonnage returned even wider.

The Experiment Station gave, through its Bulletin 75, general directions for the culture of sugar beets. The crop, however, was a new one to most of the growers. The time of harvest was an enigma. The calls for sampling directions began early in September, long before the beets were generally mature. Arrangements were early made for samples from different regions at stated periods during September and early October, to test the actual conditions as to sugar in the beets. Upon September 20th, the following circular and sugar beet blank were sent to those who were known to have received seed, and also to the press of the State.

## CIRCULAR.

### THE ANALYSIS OF SUGAR BEETS.

The Ohio Experiment Station proposes to make, free of charge, analyses of samples of sugar beets grown from the seed sent out through the liberality of the United States Department of Agriculture, by the Secretary of the Ohio State Board of Agriculture. The Station will also analyze samples of beets grown by members of associations which purchased seeds and distributed them to their members for the sugar beet test in the State, and for individuals who secured seed in this manner. The analysis, however, will not be made except in essential compliance with the above conditions and those stated below:

I. Samples, consisting of two or three sugar beets each, must be taken in accordance with the instructions herein given and delivered prepaid at Wooster or at the Experiment Station at the option of the growers; each sample must be separately wrapped and be accompanied by a Sugar Beet Blank as shown below, filled out with the important particulars called for in that blank, stating name and address of grower, meaning by this the place where beets are grown, variety of sugar beet, source of seed, date of planting, distance planted, sort of culture given, character of soil on which beets were grown, manuring used, date of digging, etc. These and other data as called for in the attached blank.

II. Samples to be sent promptly after preparation and a letter to be mailed to the Experiment Station, Wooster, stating that such a shipment has been made and enclosing a bill of lading. The samples may be sent either by express or freight. It would be cheaper for a number of growers to ship together by freight via some good connection.

The Station on its part undertakes to make determinations of the per cent. of sugar in the various samples (but not in individual beets) and to report the results, with name and address of the grower and such other data as seem essential, through its bulletins or otherwise as soon as practicable; also, to make general report of results through the press. The announcement made herein is expected to take the place of personal letters to the growers who received seed or who may have written letters of inquiry concerning analysis. Copies of this announcement may be obtained by applying to the Experiment Station, Wooster.

### DIRECTIONS FOR SAMPLING SUGAR BEETS.

Upon the maturity of the beets, as shown by yellowing and dying of the tops (for Ohio this will be from about October 15th to November 1st), dig the beets and cut off the leaves. Then sample by selecting ten average beets. From these ten select *three; be careful not to select the largest or smallest. The largest beets will always give a comparatively low per cent. of sugar; beets grown in shaded places are also very low in sugar.* Wash the three beets, wipe dry, wrap in paper and send to the Ohio Experiment Station, after placing your name and address on the paper and enclosing the sugar beet blank properly filled out. The beets can be put into a small basket or into a large box with other samples. We do not care to test miscellaneous varieties. Only the Klein Wanzlebener or Vilmorin are preferred.

Please fill out the following blank for each sort:

## SUGAR BEET BLANK.

### OHIO AGRICULTURAL EXPERIMENT STATION, WOOSTER, OHIO.

[Number of Sample.]

1. Variety.
2. Source of seed and when obtained.
3. Character of soil.

4. What crop grown on land last year?
5. Date of plowing.
6. Manuring, if any, given the land last year or this.
7. Date planted.
8. Distance planted. (State exactly.)
9. Did seed germinate well?
10. What per cent. of stand?
11. Size of plots. Give exact length and width.
12. State cultivation given the beets.
13. Date harvested.
14. Actual yield of beets (in pounds).
15. Calculated yield per acre.
16. Name.
17. Post Office.
    County and State.
18. Date of sampling.

Subsequently franking tags were distributed to all who had received seed.

It is obvious that this method of growing beets and securing samples is not free from objections nor from difficulties. Lack of familiarity with beet growing and, perhaps, at times, lack of adaptation to new undertakings, led to many misconceptions and to a fair share of failures to follow the directions given. Many omissions are apparent in the table of results; other widespread misconceptions, apparent when the samples were sent us, are not so readily determined by the results given.

One of the chief misconceptions, not easily corrected by instructions, was in respect to the size and form of the beets required for a sample. A large proportion of the beets in the samples were both badly grown and badly overgrown. The tendency to regard large size as a desirable quality cost many poor returns, and the disposition to send beets grown out of the ground was likewise well marked. Doubtless, typical sugar beets were often passed by, while overgrown beets were selected. A greatly improved character of the samples was observed in those received from associations undertaking sugar beet growing. Intelligent direction had led to the rejection of bad specimens and the selection of more typical samples. More specific directions as to plowing, planting, cultivation, etc., for next season's trials will certainly give improved samples, and doubtless, under otherwise like conditions, an increased sugar content of the beets. Plainly, closer planting is required to reduce the size of the beets and to increase the proportion of desirable ones. Attention to the depth of the soil and loosened subsoil is urgently called for. When the beet can no longer extend downward, it must be forced out of the earth by its continued increase in length. The loose, sandy lands gave samples which contrasted strongly with those from shallow soils and hard subsoil.

Yet, despite all drawbacks, the Ohio samples of sugar beets give a high average per cent. of sugar or sucrose in the beet juice and show

a good standard of purity. With somewhat careful discounting of the calculated yield of beets per acre, expressed in tons by the table, the results appear fairly representative. By this is meant that, taking into consideration the conditions of growth and the like, the results certainly assure us of the possibility of growing beets with the requisite content of sugar and of standard purity in much of middle and northern Ohio. Better growing will probably give a better average sugar percentage. Better growing with better sampling will likewise improve the purity. When we compare the averages of these tests with the probable averages of Ohio sugar beets grown under direct supervision for factory use, we are justified in concluding that they are lower rather than higher than those obtainable for a factory.

Some explanations of technical terms used in this bulletin will possibly be of aid. This will necessarily include a brief explanation of the methods of the laboratory. The beet juice may be separated by extraction with hot water, as in diffusion, or it may be pressed out of the beet pulp after grinding or grating. It may be extracted by other methods not here considered. In the laboratory our practice has been to pulp the beet in a grater and to press out the juice with a hand press. On the average it has been determined that 100 pounds of fresh, mature beets thus treated, yield 95 pounds, or 95 per cent. of juice. Some samples may yield slightly more, and beets that have wilted and dried out will yield less that 95 per cent. of juice. In this juice are dissolved the sugar, some earthy salts of potash and phosphoric acid, and certain albuminoid compounds. When the juice is evaporated without scorching, the part remaining behind will represent these solids, of which sugar is the principal constituent. In practice, the solids are determined by taking the specific gravity of the juice by a special hydrometer called a Brix spindle. It is so constructed as to give direct reading of the per cent. of total solids in the juice. The sugar is next determined by means of a polariscope, this method being practicable for handling a large number of samples quickly and cheaply. The juice is cleared or rendered translucent by treatment with subacetate of lead and filtering. The clear juice is then placed in the tube of the polariscope and the sugar determined from the rotary effect on polarized light transmitted through the clear liquid.

The total solids varies from 10 to 20 per cent., or even more, usually averaging from 15 to 18 per cent. of the weight of the juice. The sucrose or sugar in the juice varies widely, and commonly in somewhat close relative proportion to that of the solids. The purity coefficient expresses the relation of the sugar in the juice to the total solids of the same. Thus, if the total solids are 15 per cent. and the sugar is 12 per cent. of the juice, the solids not sugar are the difference or 3 per cent., and the apparent purity of the juice is twelve-fifteenths, or expressed in percentage or hundredths, it is 80.

That is, the sugar is 80 per cent. of the total solids. Should the total solids be 16 per cent. and the sugar remain but 12 per cent., the solids, not sugar, are 4 per cent, and the purity coefficient is 75 only; while if the solids are 20, and the sugar 17 per cent., respectively, the purity coefficient becomes 85. The apparent purity is here meant. The real purity is based, not only upon the amount of these solids not sugar, but upon their character as well. The minimum percentages for beet sugar manufacture are commonly placed at 12 per cent. sugar, and a purity coefficient of 80. The actual factory working seldom realizes the standard for the whole of the season's "run." To change the figures for juice into results in beets, multiply by 0.95.

In Table I are shown the full details of the season's investigations at this Station, as obtained from the reports of growers, and the analyses of 621 samples of sugar beets grown in 59 counties of Ohio in 1897. The methods employed are those outlined above and the results are expressed in the terms just explained. The sucrose was determined in most cases by the polariscope in the clarified expressed juice of the beets. In the samples analyzed previous to October 12th, the sugar was determined by Fehling solution. The solids and sucrose are given for the juice only. The weights of beets are stated in grammes. For those who desire to express them in pounds, Avoirdupois, these weights may be divided by 453.5, the number of grammes in one pound. The culture data were obtained from the reports of the growers.

It this table S. M. = stable manure; C. F. = commercial fertilizer; H. = horse cultivation; K. Wanz., or Klein Wanz., = Klein Wanzbebener. The numbers with an asterisk are omitted from averages.

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1125 | Peter Bally | Paradise Hill. | Ashland | | | Clay |
| 1239 | T. G. Steace | Ashland | " | | | Sandy loam |
| 1316 | T. E. Thornburg | " | " | Klein-Wanz | Sec. Miller | Sand & clay, thin |
| 1475 | R. P. Wallace | Loudonville | " | " | " | Gravelly |
| | Average, 4 samples. | | | | " | |
| 1476 | John Ray | Simons | Ashtabula | " | " | Light clay |
| 1515 | Herbt. Williams | Ashtabula | " | " | " | Yellow sand |
| 1185 | Henry Rosterfer | Wapakoneta | Auglaize | " | " | Dark gray sand |
| 1231 | Joseph Gerlich | " | " | " | " | Black loam |
| 1335 | Henry Kreitzer | " | " | " | " | " |
| 1353 | Geo. Bush | " | " | " | " | Black sand |
| 1360 | Wal. Freymuth | " | " | | | |
| 1523 | John Eigley | St. Johns | " | Fr. Yellow | | |
| 1524 | John Eigley | " | " | Fr. White | | |
| 1525 | John Eigley | " | " | Lane's Imp'd. | | |
| 1536 | | Wapakoneta | " | | | |
| | Average, 6 samples | | | | | |
| 1418 | J. S. Knox | Barnesville | Belmont | Klein-Wanz | Sec. Miller | Sandy |
| 1251 | C. P. Linville | Hagenbaugh | Champaign | " | " | Loam |
| 1252 | A. Monk | Osborne | Greene* | | Dpt. Agr. | Loam |
| 1134 | Holman & Sons | Springfield | Clark | Klein-Wanz | Sec. Miller | Clay, some sand |
| 1169 | J. M. Holycross | " | " | Vilmorn | " | Clay |
| 1187 | Edward Davis | Dibert | " | | Dpt. Agr. | Sandy |
| 1222 | F. W. Warden | Springfield | " | Klein-Wanz | Sec. Miller | Yellow clay |
| 1297 | J. B. Crain | Mad River | " | | Dpt. Agr. | 2d Bottom |
| 1305 | Jacob A. Barnett | Springfield | " | Klein-Wanz | Sec. Miller | Clay |
| 1334 | Jno. H. Wilson | " | " | | Dpt. Agr. | Black bottom |
| 1456 | Daniel Baker | Enon | " | | " | Clay loam |
| 1485 | W C. Grant | Selma | " | | " | Black |
| 1540 | C. T. Coates | Springfield | " | Klein-Wanz | Sec. Miller | Black sandy loam |
| | Average, 11 samples | | | | | |
| 1502 | J. P. Darling | Nellie | Coshocton | | Dpt. Agr. | Sandy loam |
| 1503 | C. Wheeler | " | " | | | |
| 1504 | J. Q. Moore | " | " | | Dpt. Agr. | Clay loam |
| 1505 | G. W. Darling | Bluff | " | | " | " |
| | Average, 4 samples. | | | | | |
| 1192 | O. B. Monnett | Bucyrus | Crawford | Vilm. Imp'd. | " | Clay loam |
| 1193 | W. T. McKinstry | " | " | | " | Black |
| 1248 | †Otis Brooks | Kirkpatrick | Marion* | | Sec. Miller | Black loam |
| 1410 | A. T. Morrow | N. Auburn | Crawford | | | Blue clay |
| 1510 | J. Lewis Beard | Bucyrus | " | | Sec. Miller | River bottom |
| 1514 | A. M. Vore | " | " | | | Black sand |
| 1520 | | " | " | | | |
| | Average, 7 samples. | | | | | |
| 1220 | Geo. W. Grah | Bedford | Cuyahoga | Vilmorin | Dpt. Agr. | Black loam |
| 1368 | B. F. Bliss | Chagrin Falls | " | " | C. F. Grange | Gravelly |
| 1370 | O. Gore | " | " | " | Dpt Agr. | Muck |
| 1371 | G. H. Kent | " | " | | " | Gravelly |
| | Average, 4 samples. | | | | | |
| 1009 | Jonas Dininger | Greenville | Darke | | | Clay |
| 1010 | Samuel Harnish | " | " | | | |
| 1011 | " | " | " | | | |
| 1012 | V. Grusenmeyer | " | " | Klein-Wanz | Imported | Clay (?) |
| 1013 | E. M. Buechly | " | " | " | Sec. Miller | |
| 1014 | R. B. Jamison | " | " | " | Lincoln, Neb | Clay |
| 1015 | " | " | " | " | " | Rich garden |
| 1056 | H. H. Tilman | " | " | " | Grusenm'y'r | Sandy clay |

* Grown in the county with which it is placed.

## BEET INVESTIGATIONS IN OHIO FOR 1897.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °brix, per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None..... | H. 1, hoe 3 ... | 12 | May 28 | Oct. 11 | Oct. 14 | Oct, 15 | 941 | 12.8 | 9.2 | 71.9 | 1125 |
| " ..... | Hoed..... | 24 | 12 | 24 | 24 | 27 | 556 | 15.8 | 11.9 | 75.3 | 1239 |
| S. m. '97.. | H. 5 ..... ..... | 9 | June 1 | 29 | 29 | Nov. 1 | 433 | 18.1 | 14.2 | 78.5 | 1316 |
| None..... | H. 2 .. ..... | ..... | May | ..... | Nov. 13 | 15 | 1,392 | 20.0 | 15.4 | 77.0 | 1475 |
| | | | | | | | 831 | 16.7 | 12.7 | 76.0 | |
| S. M. '97.. | ..... | ..... | June 4 | ..... ..... | Nov. 9 | Nov. 15 | 585 | 17.4 | 14.2 | 81.6 | 1476 |
| S. M. '95, '96, '97 | Hoed..... | ..... | ..... | ..... | 16 | 18 | 773 | 18.7 | 15.6 | 83.4 | 1515 |
| | | | | | | | 831 | 18.0 | 14.9 | 82.8 | |
| S. M. '96.. | Hoe 2... ..... | 14 | May 17 | Oct. 19 | Oct. 20 | Oct. 21 | 857 | 18.0 | 14.5 | 80.5 | 1185 |
| " .. | ..... | 12 | 22 | 21 | ..... | 27 | 1,530 | 19.3 | 15.0 | 77.7 | 1231 |
| None..... | H. 5 ..... | ..... | 20 | 30 | Oct. 30 | Nov. 2 | 576 | 20.7 | 17.7 | 85.3 | 1335 |
| " ..... | Hoe ..... | 15 | 25 | 30 | 30 | 3 | 940 | 16.9 | 12.8 | 75.7 | 1353 |
| " ..... | As potatoes. | 6 | 1 | Sept. 28 | ..... | 4 | 950 | 17.4 | 10.6 | 60.9 | 1360 |
| ..... ..... | ..... | ..... | ..... | ..... | ..... | 20 | 908 | 13.6 | 9.9 | 72.6 | *1523 |
| ..... | ..... | ..... | ..... | ..... | ..... | 20 | 903 | 10 7 | 6 8 | 63.5 | *1524 |
| ..... | ..... | ..... | ..... | ..... | ..... | 20 | 978 | 12.7 | 8.6 | 67.7 | *1525 |
| ..... ..... | ..... ..... | ..... | ..... .... | ..... ... | ..... | 20 | 1,916 | 20.0 | 15.9 | 79.4 | 1536 |
| | | | | | | | 1,128 | 18.7 | 14,4 | 77.0 | |
| S. M. '97.. | ..... | ..... | May 15 | ..... ..... | Nov. 6 | Nov. 8 | 660 | 19.1 | 16.6 | 86.9 | 1418 |
| S. M. '96.. | H., hoe 2..... | 14-16 | May 1 | Oct. 23 | ..... | Oct. 28 | 825 | 17.0 | 13 2 | 77.6 | 1251 |
| S. M. '96.. | H. 2, hoe 1.... | 7 | May 11 | Oct. 23 | Oct. 27 | Oct. 28 | 556 | 17.7 | 13.9 | 78.5 | 1252 |
| ..... ... | ..... | 21 | 15 | 13 | 13 | 18 | 763 | 17.6 | 13.2 | 75.0 | 1134 |
| S.M. '96-7 | Hoed 5..... | 31 | 17 | 18 | 19 | 21 | 1 204 | 14.7 | 10.0 | 68.0 | 1169 |
| S. M..... | H. 1, hoe 2 ... | 20 | 15 | 16 | 16 | 22 | 440 | 20.0 | 15.9 | 79.4 | 1187 |
| None..... | H. 2, hoe 3 ... | 14½ | 25 | 22 | 22 | 26 | 800 | 18.8 | 15.9 | 80.2 | 1222 |
| " ..... | H. 2, hoe 2 ... | 6 | 25 | 22 | 22 | 30 | 755 | 19.3 | 15.4 | 79.8 | 1297 |
| ..... | ..... | 28 | June 3 | 29 | 29 | Nov, 1 | 795 | 16.0 | 12.0 | 75.0 | 1305 |
| None ..... | H 3 ..... | 15-20 | 1 | 30 | Nov. 1 | 2 | 413 | 18.1 | 15.7 | 86.7 | 1334 |
| " ..... | Hoed..... | 8 | May 20 | Nov. 9 | 9 | 13 | 368 | 18.9 | 14.2 | 75.2 | 1456 |
| " ..... | Hoe 2 ..... | ..... | June 1 | 15 | 15 | 17 | 580 | 18.4 | 15.4 | 83.7 | 1485 |
| " ..... | H. 2 .. ..... | ..... | May 15 | 18 | 23 | 23 | 523 | 18 7 | 15.4 | 82.4 | 1540 |
| | | | | | | | 610 | 17.9 | 14 1 | 78.7 | |
| S. M. ,96.. | Hoe 4 ..... | 20 | May 27 | Nov. 8 | ..... | Nov. 17 | 1,221 | 16.4 | 11.6 | 70.7 | 1502 |
| ..... | ..... ..... | ..... | ..... ..... | ..... ..... | ..... | 17 | 930 | 20 8 | 15.6 | 75.0 | 1503 |
| S. M. '97.. | Hoe 2 ..... | 10 | May 25 | Nov. 5 | ..... | 17 | 393 | 17.9 | 13.0 | 72.6 | 1504 |
| S. M. '97.. | Hoe 3 ..... | 15 | 25 | 8 | ..... | 17 | 895 | 15.5 | 11.4 | 73.5 | 1505 |
| | | | | | | | 860 | 17.7 | 12.9 | 72.9 | |
| None..... | Hoe 4 ..... | 16 | June 8 | Oct. 18 | Oct. 18 | Oct. 22 | 1,958 | 16.6 | 12.4 | 74.7 | 1192 |
| " ..... | H. 2, hoe 1 ... | 3⅔ | 2 | 18 | 18 | 22 | 388 | 19.3 | 15.4 | 79.8 | 1193 |
| S M. '96.. | H..... | ..... | May 7 | ..... | 26 | 28 | 1,210 | 18.7 | 14.8 | 79.1 | 1248 |
| ..... | ..... ..... | ..... | 1 | ..... ..... | 25 | Nov. 6 | 1,293 | 18.8 | 14.7 | 78 1 | 1410 |
| ..... | ..... ..... | 15 | 10 | Nov. 1 | Nov. 16 | 18 | 1,515 | 15.9 | 11.4 | 71.7 | 1510 |
| ..... | ..... ..... | ..... | ..... | ..... .... | 15 | 18 | 532 | 20.1 | 16.1 | 80.0 | 1514 |
| ..... | ..... ..... | ..... | ..... | ..... | ..... | 18 | 780 | 15 7 | 11.7 | 74.7 | 1520 |
| | | | | | | | 1,595 | 17 9 | 13.8 | 77 1 | |
| S. M. '97.. | H. 1, hoe 1 ... | 11 | May 21 | Oct. 19 | Oct. 19 | Oct. 25 | 517 | 20.1 | 16.4 | 81.6 | 1220 |
| " .. | H., hoe..... | ..... | June 1 | Nov. 1 | Nov. 3 | Nov. 4 | 1,171 | 17.9 | 13.2 | 73.8 | 1368 |
| " .. | H. 1, hoe 1.... | ..... | Apr. 25 | Oct. 30 | ..... | 4 | 1,045 | 17.0 | 12.4 | 70.0 | 1370 |
| " '96.. | ..... | ..... | June | Nov. 1 | Nov. 1 | 4 | 842 | 13.4 | 9.7 | 72.4 | 1371 |
| | | | | | | | 894 | 17.1 | 12.9 | 75.5 | |
| ..... .... | ..... | ..... | ..... | ..... | ..... | Sept 22 | 1,197 | 15.5 | 12.8 | 82.6 | 1009 |
| ..... | ..... | ..... | May 18 | ..... | Sept. 17 | 22 | 1,323 | 15.1 | 11.1 | 73.5 | 1010 |
| ..... | ..... | ..... | 26 | ..... | 17 | 22 | 1,165 | 14.8 | 10 6 | 71.6 | 1011 |
| ..... | ..... | ..... | ..... | ..... | 20 | 22 | 887 | 15.2 | 12.8 | 84.2 | 1012 |
| ..... | H. 3, hoe 1.... | ..... | May 20 | ..... | 20 | 22 | 1,300 | 15.0 | 11.4 | 76.0 | 1013 |
| ..... | ..... ..... | ..... ... | 15 | ..... | 20 | 22 | 797 | 15.3 | 12.3 | 80.4 | 1014 |
| ..... | ..... ..... | ..... | 15 | ..... | 20 | 22 | 780 | 14.7 | 11 1 | 75.5 | 1015 |
| None..... | H 2, Hoe..... | ..... | 10 | ..... | 25 | Oct. 4 | 873 | 14.8 | 9 8 | 66.2 | 1056 |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1057 | Paul Applegate | Greenville | Darke | Klein-Wanz | Sec. Miller | Clay |
| 1058 | Jacob Wetzell | Red River | " | " | Grus'nm'yer | Black loam |
| 1059 | W. S. Grote | Pikeville | " | " | " | " |
| 1060 | I. M. Ross | German | " | | Sec. Miller | Clay loam |
| 1061 | Fred Wetzell | Red River | " | Klein-Wanz | Grus'nm'yer | |
| 1062 | Joseph Apgar | Webster | " | " | Sec. Miller | Clay loam |
| 1137 | Jonas Dininger | Greenville | " | " | " | Clay |
| 1138 | Henry Heverling | " | " | " | " | Dark clay |
| 1139 | I. M. Ross | German | " | " | " | Clay loam |
| 1151 | E. M. Buechly | Greenville | " | " | " | " |
| 1153 | Marsh'l Valentine | Arcanum | " | | Dpt. Agr | Heavy clay |
| 1154 | R. K. Beam | Ansonia | " | Klein-Wanz | Grus'nm'yer | Red sand |
| 1155 | R. B. Jamison | Greenville | " | " | Sec. Miller | Clay loam |
| 1156 | H. H. Tilman | " | " | " | Grus'nm'yer | Black sand |
| 1157 | Andrew Rentz | " | " | " | Dpt. Agr | Clay |
| 1158 | Jonas Dininger | " | " | " | Sec. Miller | " |
| 1159 | J. F. Michael | " | " | Lane's imp'd. | A.I.RootCo | " |
| 1163 | S. Rynearson | Arcanum | " | Klein-Wanz | Dpt. Agr | Black clay |
| 1184 | F.Plessinger&Bro | Beamsville | " | " | Sec. Miller | Clay |
| 1221 | Samuel Harnish | Greenville | " | " | Dpt. Agr | |
| 1223 | Val.Grusenmeyer | " | " | | Omaha,Neb | Sandy clay |
| 1224 | Isaac R. Miller | Versailles | " | Klein-Wanz | Sec. Miller | Red clay |
| 1261 | Joseph Lower | Greenville | " | " | " | Black clay |
| 1262 | G. K. Albright | Arcanum | " | " | Dpt. Agr | Black sandy loam |
| 1298 | W. H. Ivister | " | " | | | Black sand |
| 1315 | W. H. Burns | Horatio | " | Klein-Wanz | Sec. Miller | Clay |
| 1361 | W. J. Wagner | Greenville | " | " | Grus'nm'yer | Light clay loam |
| 1403 | Levi Minnick | PainterCreek | " | " | Dpt. Agr | Clay |
| 1416 | J. F. Albright | Greenville | " | " | " | Sandy loam |
| 1421 | J. F. Michael | " | " | Lane's Imp'd. | A.I.RootCo | Clay |
| 1444 | F.Plessinger&Bro | Beamsville | " | Klein-Wanz | Sugar B. As | |
| 1452 | J. A. Rodeheffer | Red River | " | " | " | Mixed loam |
| 1453 | Jacob B. Miller | Bradford | " | " | Dpt. Agr | Second bottom |
| 1454 | P. M. Witwer | " | " | | | Black |
| 1478 | A. J. Warner | Greenville | " | | | Black sand |
| 1534 | Jonas Dininger | " | " | Klein-Wanz | Sec. Miller | Clay |
| | Average, 44 samples. | | | | | |
| 1127 | C. L. Geiger | Defiance | Defiance | German Best. | Toledo, G | River bottom |
| 1213 | G. A. Armbruster | " | " | Klein-Wanz | Sec. Miller | Black sand |
| 1216 | H. S. Van Vlerah | " | " | " | Dpt. Agr | Heavy clay |
| 1266 | H. Schwartzman | Sherwood | " | | | Elm |
| 1281 | O. T. McCauley | Hicksville | " | Klein-Wanz | Dpt. Agr | Black sandy loam |
| 1282 | N. B. Hall | " | " | " | Sec. Miller | Red gravelly lo'm |
| 1283 | S. Severs | " | " | | | Muck |
| 1284 | R. T. Banks | " | " | | | Black sandy loam |
| 1285 | A. E. Barrows | " | " | | | Black clay loam |
| 1286 | Jno. Frederick | " | " | | | Black sand |
| 1287 | H. Hanna | Mark Center | " | | | Sandy clay loam |
| 1288 | R. T. Banks | Hicksville | " | | | Clay loam |
| 1289 | A. N. Purdy | " | " | | | Yellow sand |
| 1290 | W. S. Tustion | " | " | | | Black sandy loam |
| 1291 | H. W. Granday | " | " | Klein Wanz | Dpt. Agr | Muck |
| 1292 | Geo. W. Palmer | " | " | | | Sandy loam |
| 1299 | John G. Steffel | Jewell | " | | | Muck and sand |
| 1404 | L. F. Blanchard | Ayersville | " | Klein-Wanz | Dpt. Agr | Light sand |
| 1412 | Henry Greenler | Defiance | " | " | Sec. Miller | Yellow sand |
| 1443 | Fred Snodholtz | " | " | | | Second bottom |
| 1506 | Henry Troeger | Ayersville | " | Klein-Wanz | Dpt. Agr | Red sandy loam |
| 1512 | August Haase | Ney | " | | | |
| 1544 | J. J. Thieroff | Defiance | " | Klein-Wanz | Dpt. Agr | Black sand |
| | Average, 23 samples. | | | | | |
| 1130 | H. P. Miller | Sunbury | Delaware | | | |
| 1303 | Zack Davis | Delaware | " | Klein-Wanz | Sec. Miller | Black elm |
| 1307 | Zack Davis | " | " | | " | Clay |
| 1308 | Zack Davis | " | " | | " | Black elm |
| | Average, 4 samples. | | | | | |
| 1160 | John Fitz | Venice | Erie | Klein-Wanz | | Black clay |
| 1109 | J. W. Martin | Delmount | Fairfield | " | Dpt. Agr | Clay loam |
| 1250 | John C. Sweyer | Amanda | " | " | Sec. Miller | Clay |
| 1446 | O. B. Brandt | Carroll | " | " | Dpt. Agr | Limes'e & san.l'm |

BEET INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis | Average wt. of beets, grammes. | Solids in juice, °Brix, per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None..... | Hoe ..... | ..... | May 18 | ..... | Oct. 2 | Oct. 4 | 715 | 15.6 | 11.0 | 70.5 | 1057 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 1,385 | 17.4 | 13.5 | 77.5 | 1058 |
| None..... | H. 3, hoe 2... | ..... | May 7 | ..... | Oct. 2 | 4 | 1,976 | 13.1 | 9.0 | 68.7 | 1059 |
| " ..... | ..... | ..... | " 17 | ..... | Sept.25 | 4 | 706 | 13.0 | 7.4 | 56.9 | 1060 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 1 038 | 18.0 | 13.5 | 75.0 | 1061 |
| ..... | H. 4 ..... | ..... | May 20 | ..... | Oct. 1 | 4 | 725 | 16.5 | 10.8 | 65.4 | 1062 |
| S. M. '96.. | H. 4, hoe 1... | 15 1-5 | ..... | Oct. 16 | 16 | 18 | 523 | 19.0 | 14.9 | 68.4 | 1137 |
| S. M..... | Hoe ..... | ..... | 15 | 15 | 15 | 18 | 1,250 | 18.8 | 14 8 | 78.7 | 1138 |
| None ..... | ..... | ..... | 27 | 16 | 16 | 18 | 500 | 14 6 | 9.8 | 67.1 | 1139 |
| " ..... | H. 2, hoe 3... | ..... | 20 | ..... | 16 | 19 | 742 | 18.7 | 14.3 | 76.3 | 1151 |
| S. M..... | H. 2, hoe 1... | 16 | 5 | Oct. 9 | 15 | 19 | 665 | 20.2 | 15.8 | 78.2 | 1153 |
| ..... | H. 2..... | 8-10 | 20 | ..... | 15 | 19 | 598 | 16.8 | 13.5 | 80.3 | 1154 |
| S. M. '96.. | H., hoe..... | 13 | 12 | ..... | 15 | 19 | 943 | 18.8 | 14.6 | 77.6 | 1155 |
| S. M. '97.. | H. 3..... | 32 | 26 | ..... | 15 | 19 | 932 | 18.0 | 14.4 | 80.0 | 1156 |
| None..... | Hoe 2..... | 32 | 10 | Oct. 10 | 16 | 19 | 978 | 16.6 | 12.9 | 77.7 | 1157 |
| S. M. '96.. | H. 4. hoe 1... | 15 | ..... | 16 | 16 | 19 | 802 | 20.6 | 17.0 | 82.5 | 1158 |
| None..... | H. 4..... | 6 | June 15 | 16 | 16 | 19 | 555 | 18.3 | 14.8 | 80.9 | 1159 |
| " ..... | H. 2, hoe 2... | ..... | May 15 | 15 | 19 | 20 | 763 | 16.2 | 12.7 | 78.4 | 1163 |
| S. M. '97.. | H. 3..... | 8 | 20 | ..... | 16 | 21 | 625 | 19.6 | 15.8 | 80.6 | 1184 |
| None..... | ..... | ..... | 18 | Oct. 25 | 25 | 26 | 848 | 17.6 | 13.4 | 76.1 | 1221 |
| S. M..... | H..... | 6 | ..... | 25 | 25 | 26 | 476 | 21.8 | 18.2 | 83.4 | 1223 |
| None..... | H. 3..... | 3 | 15 | Sept.25 | 25 | 26 | 1,208 | 17.4 | 11.4 | 65.5 | 1224 |
| " ..... | H. 2, hoe 1... | 12 | 15 | Oct 25 | 27 | 29 | 738 | 18.5 | 14.4 | 77.8 | 1261 |
| " ..... | Hoe 2..... | ..... | 20 | 25 | 28 | 29 | 828 | 15.6 | 12.2 | 78.2 | 1262 |
| ..... | ..... | ..... | ..... | ..... | 26 | 30 | 1,780 | 14.8 | 11.0 | 74.3 | 1298 |
| None..... | H. 3, hoe 1... | 17 | June 8 | Oct. 27 | 27 | Nov 1 | 460 | 19.6 | 15.5 | 79.1 | 1315 |
| " ..... | H., hoe..... | ..... | May 25 | 15 | Nov. 2 | 4 | 650 | 17.8 | 13.9 | 78.1 | 1361 |
| S. M. '96.. | H. 5, hoe 1 | 12 | 20 | Nov. 1 | 2 | 4 | 523 | 18.7 | 14.8 | 79.1 | 1403 |
| Ch'n M.97 | H. 1, hoe 1... | ..... | June 15 | 6 | 6 | 8 | 456 | 16.5 | 11.7 | 70.9 | 1416 |
| None..... | ..... | 6 | 15 | 4 | ..... | 8 | 560 | 18.2 | 14.9 | 81.8 | 1421 |
| " ..... | ..... | ..... | ..... | ..... | Nov. 6 | 10 | 725 | 21.0 | 18.1 | 86.1 | 1444 |
| " ..... | Hoe 2..... | 15 | May 21 | Oct 15 | Oct. 23 | 13 | 1,356 | 19.0 | 14.5 | 76.3 | 1452 |
| " ..... | H. 2..... | 34 | 8 | 30 | Nov. 11 | 13 | 1,134 | 19.3 | 14.6 | 75.6 | 1453 |
| " ..... | H. 3..... | 20 | ..... | Nov. 6 | ..... | 13 | 963 | 17.0 | 13.0 | 76.5 | 1454 |
| " ..... | ..... | ..... | 1 | 1 | ..... | 15 | 550 | 18.5 | 15.5 | 83.7 | 1478 |
| S. M. '96 | H. 4, hoe 1... | 15 1-5 | ..... | Oct. 16 | Nov. 18 | 20 | 628 | 19.) | 16.2 | 85.3 | 1534 |
| | | | | | | | 864 | 17.3 | 13.3 | 79.9 | |
| None.... | H. 1, hoe 2... | ..... | May 18 | ..... | Oct. 16 | Oct. 16 | 1,356 | 17.0 | 13.8 | 81.2 | 1127 |
| S. M. '96.. | H., hoe..... | ..... | ..... | ..... | Nov. 20 | Nov. 20 | 431 | 18.4 | 14.3 | 77.6 | 1213 |
| " .. | None ..... | 2½ | June 25 | Oct. 26 | Oct. 23 | Oct. 25 | 408 | 21.0 | 16 9 | 80.4 | 1216 |
| None..... | Hoe 2 ..... | 18 3-20 | May 10 | 19 | 26 | 29 | 525 | 18.3 | 13.7 | 74.8 | 1266 |
| S. M. '97.. | H. 1, hoe 1... | ..... | ..... | ..... | 23 | 30 | 1,178 | 18.0 | 13.7 | 75.1 | 1281 |
| " '96.. | H. 2, hoe..... | 39 9-10 | May 15 | Oct. 23 | 23 | 30 | 558 | 17.7 | 13.1 | 74.3 | 1282 |
| None..... | H. hoe..... | ..... | June 1 | 15 | 23 | 30 | 260 | 14.9 | 10.8 | 72.5 | 1283 |
| " ..... | H. 2, hoe 1... | ..... | May 25 | 20 | 23 | 30 | 1,860 | 16.2 | 12.2 | 75.3 | 1284 |
| S. M. '96.. | H. 2, hoe 1... | ..... | 25 | 23 | 23 | 30 | 752 | 17.0 | 14.4 | 84.7 | 1285 |
| S.M. 96-97 | H. 2, hoe 2... | ..... | 25 | 15 | 23 | 30 | 1,235 | 16.7 | 12.4 | 74.3 | 1286 |
| S. M. '97.. | H. 1, hoe 2... | ..... | 20 | 23 | 23 | 30 | 932 | 18.0 | 14.5 | 80.5 | 1287 |
| None..... | ..... | ..... | 25 | ..... | 23 | 30 | 1,043 | 19.0 | 15.5 | 81 6 | 1288 |
| " ..... | H. 2 hoe ..... | ..... | 25 | Oct. 23 | 23 | 30 | 1,372 | 16.0 | 11.4 | 74.4 | 1289 |
| S. M. '96.. | H. 2, hoe ..... | ..... | 10 | 23 | 23 | 30 | 1,176 | 16.0 | 12.0 | 75 0 | 1290 |
| None..... | Weeded ..... | 9 | June 10 | 22 | 23 | 30 | 618 | 15.7 | 12.2 | 77.7 | 1291 |
| " ..... | H. 2. hoe..... | 13 | 1 | 10 | 23 | 30 | 732 | 17.6 | 13.4 | 76.1 | 1292 |
| " | H. 1, hoe..... | ..... | 26 | 26 | 29 | 30 | 402 | 18.1 | 14.7 | 81.2 | 1299 |
| S.M. 96-97 | Hoe 3..... | 24 | May 1 | 30 | ..... | Nov. 4 | 510 | 20.7 | 17.6 | 85.0 | 1404 |
| S. M. '96.. | H. 5, hoe 1... | 7 4-10 | 28 | Nov. 1 | Nov. 4 | 4 | 522 | 14.7 | 11.8 | 80.3 | 1412 |
| None..... | H. 2, hoe 3... | 7 | 1 | 5 | 6 | 10 | 1450[1] | 18.3 | 13.8 | 75.4 | 1443 |
| ..... | H. 3, hoe 1... | 3½ | 22 | 16 | 16 | 17 | 505 | 19.3 | 16.4 | 84.9 | 1506 |
| ..... | ..... | ..... | ..... | ..... | ..... | 18 | 965 | 16.4 | 11.5 | 70.1 | 1512 |
| None .... | H. 3, hoe 1... | 10½ | May 20 | Oct. 28 | Oct. 30 | 23 | 580 | 19 4 | 16.2 | 83 5 | 1544 |
| | | | | | | | 851 | 17.6 | 13.7 | 77.9 | |
| ..... | ..... | ..... | ..... | ..... | ..... | Oct. 16 | 685 | 18.1 | 13.4 | 74.0 | 1130 |
| S. M. '96. | H..... | 32¾ | May 15 | Oct. 30 | Oct. 30 | Nov. 1 | 522 | 17.8 | 14 0 | 78.7 | 1303 |
| ..... | H..... | 23 | 15 | 30 | 30 | 1 | ..... | 19.0 | 15.0 | 78.9 | 1307 |
| None ..... | H..... | 22 3-5 | 15 | 30 | 30 | 1 | 470 | 20.3 | 17.2 | 84,8 | 1308 |
| | | | | | | | 559 | 18.8 | 14.9 | 79.3 | |
| None..... | ..... | ..... | ..... | ..... | Oct. 16 | Oct. 19 | 1,406 | 18.6 | 15.0 | 80.6 | 1160 |
| Ch'n M.96 | H., hoe ..... | ..... | Apr. 8 | ..... | Oct. 12 | 14 | 639 | 16.0 | 11.7 | 73.0 | 1109 |
| None..... | H. 1, hoe 6... | 10 | May..... | Oct. 23 | 26 | 28 | 573 | 17.7 | 11.5 | 61.9 | 1250 |
| " ..... | Hoe ..... | 15 | 25 | 30 | ..... | Nov. 11 | 600 | 18.3 | 14.7 | 80.2 | 1446 |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1447 | J. D. Hummell | Carroll | Fairfield | Klein Wanz... | O. B. Brandt | Light sandy |
| 1448 | Dr. J. G. Nar | " | " | | | |
| | Average, 5 samples. | | | | | |
| 1084 | Dr. G. S. Franklin | Chillicothe | Fayette | | | Rich black loam.. |
| 1329 | Dr. G. S. Frankiin | " | " | | | |
| | Average, 2 samples. | | | | | |
| 1269 | Chas. Merion. Jr. | Columbus | Franklin | Klein Wanz... | Dpt. Agr | Sandy bottom |
| 1349 | Ed. S. Tussing | Can. Winch'r | " | " ... | Sec. Miller.. | Black |
| 1433 | | Columbus | " | | | |
| 1480 | Geo. W. Lakin | Marble Cliff | " | Klein Wanz... | Dpt. Agr | Black bottom. |
| 1483 | Samuel Taylor | Pleasant Crs. | " | " ... | Sec. Miller.. | Black clay |
| | Average, 5 samples. | | | | | |
| 1209 | M. J. Ammend | Delta | Fulton | Klein Wanz... | Dpt. Agr | Black loam |
| 1215 | W. B. McClarren | Winameg | " | " ... | Sec. Miller.. | Gravelly sand |
| 1295 | O. A. E. S. Sub. St. | Neapolis | " | | | Yellow sand |
| 1296 | O. A. E. S. Sub. St. | " | " | | | Black sand |
| 1318 | | Tedrow | " | | | |
| 1319 | Harmon Sasche.. | " | " | Vilmorin | Sec. Miller.. | Black sand |
| 1320 | Richard Shadle... | Ottokee | " | " | " | Clay loam... |
| 1321 | Wm. Somers | Tedrow | " | " | " | Sand |
| 1322 | Eliza Ayers | " | " | " | " | Black sand |
| 1323 | E. P. Ann | Ottokee | " | " | Grange | " |
| 1420 | Arnold Weber | Ambrose | " | " | Sec. Miller.. | Muck, new gr'nd |
| 1457 | M. G. Aumend | | " | Klein Wanz... | Dpt. Agr | Black loam |
| 1458 | A. A. Chatfield | Winameg | " | " ... | " ... | " |
| 1459 | F. S. Flemming... | Delta | " | " ... | " ... | Yellow sand |
| 1460 | W. H. Elton | " | " | " ... | " ... | Sandy |
| 1461 | R. N. Murry | " | " | " ... | " ... | " |
| 1462 | C. A. Knapp | " | " | " .. | " ... | Sandy loam |
| 1463 | B. A. Flemming.. | " | " | " ... | " ... | Yellow sand |
| 1464 | S. J. Elton | " | " | " ... | " ... | Yellow blk. sand |
| 1465 | Thos. Meridew | " | " | " ... | " ... | Light yellow sand |
| 1587 | Richard Pinstock | Swanton | " | " ... | " ... | Gravelly sand l'm |
| 1588 | J. G. Stirig | Delta | " | " ... | " ... | Sandy loam |
| 1589 | F. S. Wolcott | " | " | " ... | " ... | Sandy |
| 1591 | S. P. Dinins | Winameg | " | " ... | | |
| | Average. 24 samples. | | | | | |
| 1369 | M. Dutton | Ford | Geauga | Vilmorin | Dpt. Agr | Clay loam |
| 1372 | J. I. Clay | Chagrin Falls | " | Vilmorin | " ... | " |
| 1373 | D. Gore | " | " | Vilmorin | " ... | Sandy |
| 1374 | J. Gosney | " | " | Vilmorin | " ... | Clay loam |
| 1375 | S. S. Neece | " | " | | | Clay |
| 1438 | G. J. Sheffelton... | " | " | | Dpt. Agr | Gravelly loam |
| | Average, 6 samples. | | | | | |
| 1161 | Carl H. Morris | Bellbrook | Greene | | | Second bottom... |
| 1174 | | Jamestown | " | | | |
| 1175 | | " | " | | | |
| 1176 | M. A. Sutton | " | " | | | |
| 1177 | J. T. Cummings... | " | " | | | |
| 1178 | O. M. Conner | " | " | | | |
| 1179 | W. A. Paxson | " | " | | | |
| 1180 | F. M. Eury | " | " | | | |
| 1181 | D. M. Bailey | " | " | | | |
| 1182 | Jho. A. Walker... | " | " | | | |
| 1183 | Jas. Dobbins | " | " | | | |
| | Average, 11 samples. | | | | | |
| 1434 | Wilson S. Cole | Kenton | Hardin | | | Black |
| 1509 | J. M. Weaver | | Hardin | Vilmorin | Price & Co. | Loam |
| 1537 | E. W. Bascom | McGuffey | " | Vilmorin | Sec. Miller.. | Muck |
| 1230 | J. A. George | Mansfield | " | | | |
| | Average, 3 samples. | | | | | |

BEET INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix., per cent. | Sucrose in juice, per cent. | Purity coefficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S. M. '96 | Hoe 4 | 27 | May 15 | Nov. 3 | Nov. 4 | Nov. 11 | 520 | 18.6 | 14.4 | 77.4 | 1447 |
| | | | | | 4 | 11 | 663 | 15.1 | 11.7 | 77.3 | 1448 |
| | | | | | | | 599 | 17.1 | 12.8 | 74.9 | |
| | Hoe | | June 1 | | Oct. 8 | Oct. 11 | 666 | 17.7 | 13.4 | 77.9 | 1084 |
| | " | | " | | | Nov. 2 | 574 | 19.2 | 15.7 | 81.8 | 1329 |
| | | | | | | | 620 | 18.5 | 14.6 | 78.9 | |
| None | Hoe 2 | 15 | May 15 | Oct. 12 | Oct. 26 | Oct. 29 | 444 | 20.5 | 16.9 | 82.4 | 1269 |
| S. M. '96 | | 21½ | 20 | 27 | 27 | Nov 3 | 775 | 16.8 | 12.8 | 76 2 | 1349 |
| | | | | | | 9 | 520 | 20.8 | 16.2 | 77.8 | 1433 |
| None | H. 3, hoe 1 | | May 10 | | Nov. 13 | 15 | 306 | 18.0 | 14.2 | 78.9 | 1480 |
| " | | | June 1 | Nov. 12 | | 15 | 578 | 19.3 | 16.3 | 82.9 | 1483 |
| | | | | | | | 524 | 19.1 | 15,3 | 80.9 | |
| S. M. '96 | H., hoe | 22 | Mar. 8 | Oct. 18 | Oct. 18 | Oct. 23 | 1,224 | 20.0 | 17.3 | 86.5 | 1209 |
| S. M. | H. 2, hoe 2 | 10–14 | May 10 | 18 | 17 | 25 | 873 | 17.5 | 13.6 | 77.7 | 1215 |
| | H. 2, hoe 1 | 12 | | | 27 | 30 | 383 | 18.0 | 14.6 | 81.1 | 1295 |
| | H. 2, hoe 1 | 12 | | | 27 | 30 | 480 | 17.5 | 15.0 | 85.7 | 1296 |
| | | | | | 29 | Nov. 1 | 1,398 | 16.4 | 13.4 | 81.7 | 1318 |
| S. M. '96 | H. 3, hoe 1 | 13 7/10 | June 10 | Oct. 25 | 25 | 1 | 1,531 | 17.5 | 13.4 | 76.6 | 1319 |
| None | Hoe | 11½ | 1 | 20 | 20 | 1 | 1,233 | 16.9 | 13.1 | 77.5 | 1320 |
| S. M. '96 | H. 4, hoe 4 | 12 7/10 | May 25 | 25 | 25 | 1 | 1,358 | 17.6 | 13.9 | 79.0 | 1321 |
| S. M. '97 | H. 2, hoe 1 | 11 | 18 | Sep. 24 | 24 | 1 | 1,837 | 16.8 | 13.6 | 80.5 | 1322 |
| None | Hoe | | June 12 | Oct. 23 | 23 | 1 | 962 | 14.1 | 10.0 | 70 9 | 1323 |
| " | H. 2, hoe 1 | 36 | May 15 | Nov. 2 | | 8 | 765 | 16.0 | 12.1 | 75.5 | 1420 |
| S. M. '96 | H., hoe | 4 7/25 | Mar. 8 | Oct. 13 | Oct. 13 | 13 | 808 | 20.5 | 17.7 | 86.3 | 1457 |
| S.M. '96-7 | " | | May 15 | 29 | 29 | 13 | 1 205 | 19.5 | 16.4 | 84.1 | 1458 |
| | Hoe 1 | | 25 | 30 | Nov. 3 | 13 | 948 | 15.1 | 9.8 | 64.9 | 1459 |
| S. M. '96 | H. hoe | | 20 | 22 | Oct. 22 | 13 | 1 787 | 16.3 | 12.6 | 77.3 | 1460 |
| S.M. '96-7 | H. 3, hoe 2 | | 20 | 16 | 16 | 13 | 1 015 | 19.6 | 16.2 | 82.7 | 1461 |
| None | " | 28 | 15 | Nov. 3 | Nov. 3 | 13 | 862 | 17.0 | 13.1 | 77.0 | 1462 |
| S. M. '97 | H., hoe | 136 | 20 | Oct. 31 | Oct. 30 | 13 | 1,354 | 17.2 | 12.5 | 70.2 | 1463 |
| S. M. '96 | " | 31 | 25 | 15 | 15 | 13 | 998 | 18.7 | 12.8 | 68.4 | 1464 |
| S. M. '97 | Hoe | | 15 | | 23 | 13 | 1,121 | 18.3 | 15.0 | 82.0 | 1465 |
| S. M. | H. 5, hoe 1 | | 24 | | Nov. 4 | Dec. 1 | 1,361 | 18.5 | 15.4 | 83 2 | 1587 |
| " | H. 3, hoe 1 | | June 1 | Nov. 6 | 6 | 1 | 714 | 18.5 | 13.1 | 70.2 | 1588 |
| S. M. '95 | H. 4, hoe 2 | | May 19 | Oct. 23 | 12 | 1 | 817 | 21.0 | 17.5 | 83.3 | 1589 |
| | | | | | | 1 | 453 | 19.1 | 15.8 | 82.7 | 1591 |
| | | | | | | | 1,055 | 17.8 | 14.1 | 79.2 | |
| S. M. | | | June 5 | Oct. 30 | | Nov. 4 | 762 | 17.8 | 14.5 | 81.5 | 1369 |
| None | H. 3, hoe 2 | 14 | 12 | 30 | | 4 | 963 | 18.2 | 15.4 | 84.6 | 1372 |
| S. M. | H. 2, hoe 2 | | Apr. 21 | 30 | | 4 | 303 | 19.0 | 15.5 | 81.6 | 1373 |
| " | | | June 20 | 30 | | 4 | 943 | 20.2 | 18.0 | 89.1 | 1374 |
| S. M. '96-7 | | | 27 | Nov. 1 | | 4 | 474 | 19.0 | 15.7 | 82 6 | 1375 |
| S. M. '96 | Garden | 21 | May | 6 | No v. 6 | 9 | 753 | 21.0 | 18.5 | 88.0 | 1438 |
| | | | | | | | 694 | 19.2 | 16.3 | 84.8 | |
| None | H. 1, hoe 1 | | May 1 | | Oct. 19 | Oct. 20 | 373 | 18.2 | 15.5 | 85.1 | 1161 |
| | | | | | | 21 | 1,293 | 14.8 | 10.0 | 67.5 | 1174 |
| | | | | | | 21 | 1,253 | 14.5 | 10.0 | 68.9 | 1175 |
| | | | | | | 21 | 1,440 | 12.6 | 7.1 | 56.3 | 1176 |
| | | | | | | 21 | 930 | 13.8 | 10.0 | 72.5 | 1177 |
| | | | | | | 21 | 750 | 17.0 | 12.3 | 72.3 | 1178 |
| | | | | | | 21 | 870 | 18.4 | 13.9 | 75.5 | 1179 |
| | | | | | | 21 | 2,246 | 12.3 | 7.4 | 60.1 | 1180 |
| | | | | | | 21 | 1,486 | 13.6 | 8.0 | 58.8 | 1181 |
| | | | | | | 21 | 2,496 | 13.2 | 7.5 | 56.8 | 1182 |
| | | | | | | 21 | 1,000 | 13.4 | 7.2 | 53 7 | 1183 |
| | | | | | | | 1,285 | 14.8 | 9.9 | 66.8 | |
| S M 96 | | | | | | Nov. 9 | 292 | 19.4 | 14.5 | 74.7 | 1434 |
| None | H. 3 | | May | Oct. 20 | | 17 | 1,350 | 11.5 | 5.2 | 45.2 | *1509 |
| None | | | May 6 | Oct. | | 20 | 818 | 13.2 | 8.8 | 66.7 | 1537 |
| | | | | | | Oct. 27 | 1,288 | 16.4 | 13.0 | 79.3 | 1230 |
| | | | | | | | 796 | 16.3 | 12.1 | 74.2 | |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1232 | C. Packham | Liberty Cen. | Henry | | | |
| 1233 | N. Eversole | " | " | | | |
| 1254 | Shelly & Bro | Holgate | " | | | |
| 1293 | E. N. Weaver | Florida | " | Klein Wanz | Dpt. Agr | Clay and gravel |
| 1294 | Th. Weddelman | " | " | " | | Sandy |
| 1309 | Jacob Holrung | New Bavaria | " | " | Dpt. Agr | Black loam |
| 1310 | John M. Worth | Napoleon | " | " | " | Sandy |
| 1311 | Geo. N. Bogart | " | " | " | " | Sandy loam |
| 1312 | Fred Priggie | Okolona | " | | | |
| 1313 | Levi Hartman | Napoleon | " | Klein Wanz | Dpt. Agr | Black botton |
| 1314 | Milton Walke | " | " | " | " | Black sandy loam |
| 1317 | John Sheets | " | " | | G. Bogard | Sandy loam |
| 1383 | Wm. McGee, Sr. | West Hope | " | Klein Wanz | E. E. Decker | Sandy |
| 1384 | E. E. Decker | " | " | " | Dpt. Agr | Black sand |
| 1387 | P. B. Springer | Grand Rapids | " | " | | Sandy soil |
| 1399 | John Foltz | McClure | " | | | Black sandy loam |
| 1401 | N. S. Landis | Grand Rapids | " | | | Black sand |
| 1402 | Peter Johnson | Texas | " | | | Clay |
| 1473 | J. W. Durham | Napoleon | " | Klein Wanz | Sec. Miller | Sandy clay |
| 1482 | G. W. Parry | Florida | " | " | Dpt. Agr | Sandy loam |
| 1493 | Adam Schunder | Dreshler | " | | | |
| 1507 | E. L. Emery | Grelton | " | Klein Wanz | Sec. Miller | Sandy |
| 1508 | S. P. Murry | " | " | " | " | Sandy loam |
| 1517 | William Brooks | Okolona | " | " | Dpt. Agr | |
| 1539 | Ferdin'd Detmer | Napoleon | " | | | |
| 1545 | L. V. Ward | Deshler | " | French Red | A. Livingst'n | & Son, Black loam |
| 1546 | P. M. Wood | " | " | " | | |
| 1547 | R. J. Shoemaker | " | " | Manly Impr'd | Manly, Phila. | Pa., Black loam |
| 1548 | | " | " | Ferry's Imp'd | Dpt. Agr | |
| 1555 | H. Behnfelat, Jr. | Okolona | " | Klein Wanz | " | Black loam |
| 1559 | S. Shaffer | McClure | " | | | Sandy |
| 1592 | S. A. Bacon | Grand Rapids | " | | | " |
| 1347 | E. E. Decker | West Hope | " | | Dpt. Agr | Black sand |
| | Average, 25 samples | | | | | |
| 1484 | I. P. Williams | Greenfield | Highland | | | Limestone clay |
| 1265 | J. K. Friend | Laurelville | Hocking | | | Sandy clay |
| 1241 | E. D. Oswald | Winesburgh | Holmes | Klein Wanz | Dpt. Agr | |
| 1242 | W. M. Debeny | " | " | " | " | |
| 1244 | Christ Weiss | " | " | " | " | Sandy loam bot'm |
| 1246 | Isaac Barkey | " | " | " | " | Sandy loam |
| 1247 | D. H. Horst | " | " | " | " | Sandy shale |
| 1426 | Jos. H. Harrow | Mt. Eaton | " | " | " | Limestone clay |
| | Average, 6 samples | | | | | |
| 1429 | L. A. Truxell | N. Fairfield | Huron | | Dpt. Agr | Clay loaam |
| 1131 | F. C. Ball | Mt. Vernon | Knox | | | |
| 1217 | Wm. McFadden | " | " | | | |
| 1268 | E. W. Bell | " | " | | Dpt. Agr | Clay Loam |
| 1336 | Ben Ames | " | " | Lane's Imp'd | Livington & | Son " |
| | Average 2 samples | | | | | |
| 1148 | C. J. Richardson | Willoughby | Lake | Klein Wanz | | Sandy |
| 1532 | Thos. Baster | Madison | " | " | | Clay loam |
| 1533 | O. W. Kneale | " | " | " | Sec. Miller | Sandy loam |
| 1563 | H. Becker | Mentor | " | | Dpt. Agr | |
| 1564 | Edward Garrett | " | " | Vilmorin | | Sandy |
| | Average, 3 samples | | | | | |
| 1164 | A. Flory | Newark | Licking | | Dpt. Agr | Sandy loam |
| 1190 | John W. Price | Vannatta | " | Klein Wanz | Sec. Miller | Clay & sandy loam |
| 1226 | " | " | " | " | " | " " |
| 1227 | Geo. Nash | " | " | " | " | Sandy loam |
| 1228 | C. H. Price | Norman | " | " | " | Clay & sandy loam |
| 1229 | P. F. Koontz | St. Louisville | " | " | " | Sandy loam |
| 1526 | Frank Koontz | " | " | " | " | " |
| 1554 | James P. Holmes | " | " | | | |
| 1577 | Bruce Stewart | Newark | " | | | |
| 1578 | John M. Lambert | " | " | | Dpt. Agr | Clay |
| 1619 | John W. Price | Vannatta | " | Klein Wanz | Sec. Miller | Sandy loam |
| | Average, 10 samples | | | | | |

BEET INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix, per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... ..... | ..... | ..... | ..... | ..... | ..... | Oct. 27 | 290 | 18.4 | 14.3 | 77.7 | 1222 |
| ..... | ..... ..... ..... | ..... | ..... | ..... | ..... | 27 | 1,060 | 13.3 | 9.9 | 74.3 | *1233 |
| ..... | ..... | ..... | ..... | ..... | ..... | 28 | 1,356 | 18.3 | 13.7 | 74.8 | 1254 |
| S. M..... | F. 5, hoe 2... | ..... | May 12 | Oct. 12 | Oct. 28 | 30 | 573 | 20.5 | 14.7 | 71.7 | 1293 |
| S. M. '96.. | H. 3, hoe 3... | ..... | 25 | 26 | 29 | 30 | 973 | 19.6 | 16.2 | 82.7 | 1294 |
| " | ..... | 8½ | 10 | 30 | 30 | 30 | 581 | 20.3 | 17.2 | 84.8 | 1309 |
| " | Hoe ..... | 41 | 1 | 29 | 28 | Nov. 1 | 545 | 17.8 | 14.3 | 80.3 | 1310 |
| None..... | H. 3, hoe 1... | 14 | 9 | 28 | 28 | 1 | 985 | 19.4 | 16.0 | 82.5 | 1311 |
| ..... | ..... | ..... | ..... | ..... | 28 | 1 | 850 | 16.0 | 12.3 | 76.8 | 1312 |
| S. M. '96 | ..... | 34 | May 1 | Oct. 28 | 27 | 1 | 530 | 18.5 | 14.9 | 79.4 | 1313 |
| None..... | H. 3, hoe 1... | 11 | 11 | 27 | 27 | 1 | 985 | 19.6 | 16.3 | 83.1 | 1314 |
| S. M..... | H. 5..... | ..... | 15 | 15 | 24 | 1 | 1,660 | 14.1 | 9.9 | 70.2 | *1317 |
| S. M. '97.. | Hoe ..... | ..... | Apr. 26 | 28 | 28 | 4 | 1,341 | 18.1 | 12.8 | 70.7 | 1383 |
| " '96.. | " ..... | ..... | 28 | 28 | 28 | 4 | 1,057 | 17.2 | 12.6 | 73.2 | 1384 |
| " '97.. | " 2..... | ..... | May 19 | 12 | 12 | 4 | 1,224 | 17.6 | 14.0 | 79.5 | 1387 |
| None .... | " 1..... | ..... | May 6 | 16 | 16 | 4 | 930 | 19.7 | 15.9 | 80.6 | 1399 |
| " ..... | H. 2, hoe 2... | 24 | 13 | 18 | 18 | 4 | 570 | 17.5 | 14.0 | 80.0 | 1401 |
| " ..... | H. 4, hoe 3... | 16 | 24 | 11 | 11 | 4 | 1,030 | 18.0 | 14.2 | 78.9 | 1402 |
| " ..... | H. 4, hoe 2... | ..... | 25 | Nov. 10 | ..... | 15 | 623 | 18.7 | 16.6 | 88.8 | 1473 |
| " ..... | H. 3, hoe 1... | 40 | 10 | ..... | Nov. 10 | 17 | 680 | 19.4 | 15.6 | 80.4 | 1482 |
| " ..... | H. 3..... | ..... | 15 | Oct. 20 | ..... | 17 | 843 | 20.8 | 16.8 | 80.8 | 1493 |
| " ..... | Hoe ..... | 10 | 13 | 29 | ..... | 18 | 590 | 21.0 | 18.4 | 87.6 | 1507 |
| " ..... | H., hoe ..... | 21 | Apr. | Nov. 10 | Nov. 10 | 18 | 526 | 20.0 | 16.7 | 83.4 | 1508 |
| " ..... | Hoe 3..... | ..... | May 25 | 16 | 16 | 18 | 898 | 18.5 | 15.0 | 81.1 | 1517 |
| " ..... | ..... | ..... | 10 | 12 | ..... | 23 | 1,315 | 19.1 | 15.6 | 81.7 | 1539 |
| " ..... | H. 3, hoe 1... | ..... | 12 | Nov. 6 | Nov. 20 | 23 | 1,752 | 13.4 | 9.0 | 67.2 | *1545 |
| S. M..... | ..... | ..... | ..... | ..... | ..... | 23 | 1,353 | 13.5 | 8.1 | 59.9 | *1546 |
| " ..... | H., hoe ..... | 24 | June 20 | Nov. 1 | ..... | 23 | 1,265 | 10.0 | 5.6 | 56.0 | 1547 |
| " ..... | " ..... | 24 | July 1 | 1 | ..... | 23 | 1,422 | 11.7 | 7.1 | 59.8 | *1548 |
| None ..... | H. 2, hoe 3... | ..... | May 20 | 9 | ..... | 24 | 520 | 21.5 | 19.0 | 88.3 | 1555 |
| " ..... | Hoe 2..... | 34 | 29 | 8 | ..... | 25 | 480 | 19.3 | 15.9 | 82.3 | 1559 |
| " ..... | H. 1, hoe 1... | ..... | 31 | 10 | Nov. 10 | Dec. 1 | 225 | 22.0 | 20.0 | 90.9 | 1592 |
| S. M..... | Hoe ..... ..... | ..... | 18 | Oct. 30 | Oct. 30 | Nov. 3 | 1,650 | 15.2 | 10.2 | 67.1 | *1347 |
| | | | | | | | 810 | 18.9 | 15.3 | 80.9 | |
| ..... | ..... ..... | ..... | ..... | ..... | Nov, 15 | Nov. 17 | 840 | 19.3 | 13.2 | 68.4 | 1484 |
| None..... | H. 1..... | 20 | June 11 | Oct. 28 | Nov. 25 | 29 | 1,521 | 12.2 | 7.2 | 59.0 | 1265 |
| ..... | ..... ..... | 11½ | ..... | ..... | Oct. 26 | Oct. 28 | 637 | 15.1 | 11.2 | 74.2 | 1241 |
| ..... | ..... ..... | ..... | ..... | ..... | 26 | 28 | 992 | 16.5 | 13.4 | 81.2 | 1242 |
| S. M. '97.. | ..... .... ..... | ..... | ..... | ..... | 26 | 28 | 425 | 14.8 | 11.7 | 79.0 | 1244 |
| ..... | ..... | ..... | ..... | ..... | 26 | 28 | 778 | 17.3 | 14.1 | 81.5 | 1246 |
| ..... | ..... | ..... | ..... | ..... | 26 | 28 | 636 | 16.9 | 12.6 | 74.6 | 1247 |
| S. M. '96.. | ..... ..... | ..... | July 4 | Nov. 5 | ..... | Nov. 9 | 614 | 20.1 | 17.0 | 84.6 | 1426 |
| | | | | | | | 680 | 16.8 | 13.6 | 81.0 | |
| S. M. '97.. | Hoe 3..... | 167-10 | May 25 | Nov. 6 | Nov. 6 | Nov. 9 | 303 | 21.0 | 16.0 | 76.1 | 1429 |
| ..... ..... | ..... ..... | ..... | ..... | ..... | Oct. 16 | Oct. 16 | 595 | 19.4 | 15.9 | 81.9 | 1131 |
| ..... | ..... ..... | ..... | ..... | ..... | 17 | 25 | 1.099 | 18.0 | 13.1 | 72.2 | *1217 |
| None..... | H. 3, hoe 1... | 14 | May 15 | ..... | 28 | 29 | 690 | 19.3 | 15.8 | 81.9 | 1268 |
| S. M. '96.. | H. 2, hoe 2... | 15 1-8 | 15 | Oct. 2 | 30 | Nov. 2 | 675 | 11.6 | 8.0 | 69.0 | *1336 |
| | | | | | | | 642 | 19.4 | 15.9 | 81.9 | |
| S. M..... | Hoe ..... | ..... | Apr. 30 | ..... | ..... | Oct. 19 | 414 | 21.4 | 19.3 | 90.1 | *1148 |
| ..... | H. 3, hoe 3... | ..... | June 8 | Nov. 10 | ..... | Nov. 20 | 835 | 18.0 | 15.7 | 82.1 | 1532 |
| S. M..... | Hoe 4..... | ..... | May 20 | 13 | ..... | 20 | 1 034 | 16.3 | 12.1 | 74.1 | 1533 |
| ..... | ..... | ..... | ..... | ..... | ..... | 26 | 331 | 22.0 | 20.0 | 99.9 | *1563 |
| S. M. '97.. | ..... | 30 | ..... | ..... | ..... | 26 | 500 | 19.8 | 16.8 | 84.8 | 1564 |
| | | | | | | | 789 | 18.0 | 14.9 | 82 7 | 14.9 |
| None..... | H. 2..... | ..... | May | Oct. 18 | Oct. 19 | Oct. 20 | 833 | 15.8 | 12.5 | 79.1 | 1164 |
| " ..... | ..... | 15 | 12 | 16 | 18 | 22 | 530 | 18.5 | 14.5 | 78.3 | *1190 |
| " ..... | ..... ..... | 16 | Apr. 22 | 16 | 18 | 27 | 570 | ..... | ..... | ..... | ..... |
| " ..... | H..... | 16 | May 15 | 15 | 15 | 27 | 573 | 16.6 | 13.3 | 80.1 | 1227 |
| ..... | ..... | ..... | ..... | ..... | 18 | 27 | 795 | 13.8 | 10.1 | 73.1 | 1228 |
| None..... | H..... | 144-10 | May 15 | Oct. 16 | 16 | 27 | 872 | 15.3 | 11.1 | 72.5 | 1229 |
| " ..... | " ..... | 15 | 20 | Sept. 15 | Nov. 16 | Nov. 20 | 363 | 15.6 | 11.4 | 73.1 | 1526 |
| ..... | ..... | ..... | ..... | ..... | ..... | 24 | 460 | 19.2 | 15.3 | 79.6 | 1554 |
| ..... | ..... | ..... | ..... | ..... | ..... | 29 | 1,061 | 18.0 | 13.5 | 74.9 | 1577 |
| ..... | Hoe, hoe 2... | 9½ | May 20 | Nov. 15 | Nov. 23 | 29 | 1,066 | 18.2 | 14.3 | 78.5 | 1578 |
| ..... | H, hoe..... | 15 | 12 | Oct. 16 | Dec. 4 | Dec. 8 | 397 | 16.0 | 10.8 | 67.5 | 1619 |
| | | | | | | | 562 | 15.9 | 11.9 | 74.9 | |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1259 | J. G. Hewlings | West Liberty | Logan | | C.Spreckels | Sandy clay |
| 1518 | Jesse Jenkins | Rushsylvania | " | Klein-Wanz | Sec. Miller | Black bottom |
| | Average, 2 samples. | | | | | |
| 1415 | F. M. Sheppard | Brighton | Lorain | " | " | Yellow loam and sand. |
| 1249 | L. W. Haskins | Waterville | Lucas | " | " | Sandy loam |
| 1386 | C. Finkenbiner | Neapolis | " | " | | Sandy |
| 1388 | Geo. Brown | Fancher | " | " | | " |
| 1390 | W. H. Dresher | " | " | " | | " |
| 1392 | Geo. H. Clantz | Grand Rapids | " | " | | Black & yel. sand |
| 1393 | W. D. Streeter | Fancher | " | " | | Sandy loam |
| 1395 | L. W. Crosby | Grand Rapids | " | " | | Sandy |
| 1396 | Wm. Schultz | " | " | " | | Black & yel. sand |
| 1398 | Levi Hutchinson | " | " | | | Sandy loam |
| 1439 | G. W. Bamsey | Mitchaw | " | | Dpt. Agr | Mixed loam |
| 1440 | G. W. Bamsey | " | " | | " | " |
| 1441 | G. W. Bamsey | " | " | | " | |
| 1466 | J. S. Miller | Richfield Cen. | " | | " | Black sandy loam |
| 1467 | Geo. Drennan | Java | " | | " | Light sand & clay |
| 1470 | D. R. Mathews | Neapolis | " | | Sec. Miller | Yellow sand |
| 1471 | O. J. Britton | " | " | | " | Dark sand |
| 1474 | M. P. Sanders | Richfield Cen. | " | | Dpt. Agr | Black sand |
| 1491 | C. A. Tracy | E. Toledo | " | | | " |
| 1492 | Dr. W. H. Hickey | Leipsic | " | | | " |
| 1516 | F. Green | Mitchaw | " | | | Gravelly |
| 1542 | M. Lochbihler(1) | Richfield Cen. | " | | Dpt. Agr | Black sand |
| 1551 | M. Lochbihler(2) | " | " | | " | Clay |
| 1560 | G. C. Betts | Fancher | " | | | Sand and loam |
| 1585 | Michael Smith | Mitchaw | " | | | Black loam, clay. |
| 1594 | H. M. Talmadge | | " | | | Sandy |
| 1595 | J. G. Schaffer | Hillsdale | Michigan | | | Sandy loam |
| 1596 | M. P. Woodlin | Toledo | Lucas | | | Sandy |
| 1606 | John Freworth | Grand Rapids | " | | | |
| 1557 | James L. Miller | " | " | | | Black sand |
| 1558 | Lewis F. Crosby | " | " | | | Black sand |
| 1607 | Charles Winter | Neowash | " | | | Sandy |
| 1610 | Ed. Walters | Fancher | " | | | " |
| 1620 | C. D. Kuntz | Ironville | " | | | Yellow clay |
| | Average, 30 samples. | | | | | |
| 1417 | H. D. Folmer | W. Jefferson | Madison | Klein-Wanz | Dpt. Agr | Blk. & white clay |
| 1430 | H. D. Folmer | " | " | " | " | " |
| 1435 | John Davis | " | " | | " | Black |
| 1472 | C. M. Dum | " | " | | " | Black loam |
| 1556 | D. R. Edwards | " | " | | Grange | Black |
| | Average, 5 samples. | | | | | |
| 1104 | G. E. Longacre | Caledonia | Marion | Klein-Wanz | Harman&S. | Black sandy loam |
| 1105 | Wm. Brocklesby | " | " | " | " | " |
| 1106 | L. J. Russell | " | " | " | " | Black |
| 1107 | M. Koch | " | " | | | |
| 1108 | G. C. Rinker | " | " | Klein-Wanz | Harman&S. | |
| 1189 | Carl F. Krautter | Agusta | " | | Sec. Miller | Black |
| 1354 | L. J. Russell | Caledonia | " | Marmans [Colossus. | Harman&S. | Black loam |
| 1126 | P. J. Baker | Seville | Medina | | | |
| 1362 | John Hange | Lodi | " | | Dpt. Agr | Clay |
| 1413 | D. A. Clapp | Chatham | " | | | " |
| 1565 | H. M. Koppes | Acme | " | | Dpt. Agr | Gravelly |
| 1566 | H. M. Koppes | " | " | | " | " |
| 1569 | H. M. Koppes | " | " | | " | " |
| | Average, 5 samples. | | | | | |
| 1110 | A. W. Larue | Wabash | Mercer | | | |
| 1194 | Joseph Osterfield | St. Henry | " | | | |
| 1277 | James Dague | Celina | " | Klein-Wanz | Jos.Schunck | Sandy clay |
| 1278 | B. Johnsman | " | " | " | " | White clay |
| 1279 | John Haubert | Coldwater | " | " | " | Mix. loam & sand |
| 1280 | Joseph Schank | Celina | " | " | Sec. Miller | Loam and sand |
| 1324 | | " | " | | | |
| 1450 | H. B. Bennett | Montezuma | " | Lane's Sugar | Everitt,Ind. | Black loam |
| 1616 | Wm. B. Doner | Wabash | " | Vilmorin | Dpt. Agr | Light sand |

BEET INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix, per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None..... | Hoe 2 ..... | 17 8/10 | June 3 | Oct. 26 | Oct. 28 | Oct. 29 | 805 | 15.2 | 11.4 | 75.8 | 1259 |
| " ..... | H. 2, hoe 2 ... | ..... | 10 | ..... | Nov. 17 | Nov. 18 | 753 | 17 0 | 14.1 | 82.8 | 1518 |
| | | | | | | | 779 | 16.1 | 12.8 | 80.0 | |
| " ..... | H. 1, hoe 2 ... | 14 7/10 | June 1 | Nov. 2 | Nov. 5 | Nov. 6 | 520 | 19.7 | 16.0 | 81.2 | 1415 |
| S. M.. .... | H..... | ..... | May 29 | Oct. 22 | Oct. 26 | Oct. 28 | 567 | 20.6 | 16.9 | 82.0 | 1249 |
| S. M. '96.. | H. 2, hoe 3 ... | ..... | 22 | 15 | 16 | Nov. 4 | 1,140 | 17.2 | 13.8 | 80.2 | 1386 |
| None ..... | Hoe 3 ..... | ..... | 19 | 18 | 18 | 4 | 1,017 | 15.6 | 12.5 | 80.1 | 1388 |
| S. M. '97.. | Hoe 3 ..... | 18 | 19 | 16 | 14 | 4 | 846 | 16.8 | 13.3 | 79.0 | 1390 |
| S. M. '97.. | H. 2, hoe 1 ... | ..... | 25 | 23 | 23 | 4 | 668 | 17.9 | 14.6 | 81.6 | 1392 |
| D. B. '96.. | Hoe 3 ..... | 19 | 8 | 19 | 19 | 4 | 809 | 17.3 | 13.8 | 79.8 | 1393 |
| ..... | ..... | ..... | ..... | 15 | 15 | 4 | 543 | 17.5 | 12.7 | 72.5 | 1395 |
| S. M. '97. | Hoe 2 ..... | 21 | ..... | 12 | 12 | 4 | 2,015 | 12.8 | 8.5 | 66.1 | 1396 |
| None..... | Hoe 4 ..... | 22 | May 22 | Sept.28 | ..... | 4 | 759 | 15.9 | 11 6 | 73.0 | 1398 |
| S. M. '96.. | ..... | 9½ | 5 | Oct. 30 | ..... | 9 | 426 | 21.0 | 20.8 | 94.2 | 1439 |
| S. M. '96.. | ..... ..... | 14¼ | 5 | Nov. 6 | ..... | 10 | 695 | 21.0 | 17.9 | 85.2 | 1440 |
| ..... | ..... | ..... | ..... | ..... | ..... | 10 | 735 | 21.0 | 18.4 | 87.6 | 1441 |
| S. M. '97.. | H. 3, hoe 2 ... | 10 | June | Oct. 15 | ..... | 13 | 915 | 18.6 | 14.0 | 75.3 | 1466 |
| ..... | ..... | ..... | May 20 | ..... | ..... | 13 | 918 | 20.5 | 15.5 | 75.6 | 1467 |
| S. M. '96.. | ..... | 32 | May 15 | Nov. 8 | Nov. 12 | 15 | 1,470 | 19.0 | 13.6 | 71.5 | 1470 |
| S. M. '96.. | Hoe ..... | ..... | 5 | 9 | 12 | 15 | 1,270 | 18.8 | 15.2 | 80.8 | 1471 |
| S. M. '96-7 | H., hoe..... | 7 | June 1 | 6 | ..... | 15 | 1,053 | 19.4 | 14.5 | 74.7 | 1474 |
| S. M..... | ..... | ..... | May | ..... | ..... | 17 | 544 | 16.0 | 11.4 | 71.2 | 1491 |
| ..... | ..... | ..... | ..... | Nov. 6 | ..... | 17 | 1,428 | 18.8 | 14.4 | 77.8 | 1492 |
| None..... | H ..... .... | 12 | June 2 | 12 | ..... | 18 | 511 | 19.7 | 16.6 | 84.3 | 1516 |
| ..... | ..... | ..... | ..... | ..... | ..... | 23 | 1,155 | 12.2 | 9.1 | 74.4 | 1542 |
| S. M. '96.. | ..... | ..... | ..... | Nov. 5 | ..... | 23 | 633 | 18.2 | 13.6 | 74.7 | 1551 |
| None..... | Hoe 2 ..... | ..... | May 25 | ..... | ..... | 25 | 760 | 21.2 | 16.3 | 76.8 | 1560 |
| S. M. '96-7 | H. 3, hoe 2 ... | ..... | June 12 | Nov. 18 | Nov. 18 | 29 | 432 | 20.2 | 16.5 | 81.6 | 1585 |
| ..... | ..... | ..... | ..... | ..... | 23 | ..... | 954 | 19.2 | 15.8 | 92.3 | 1594 |
| ..... | ..... | ..... | May 25 | ..... | ..... | Dec. 1 | 668 | 15.1 | 9.9 | 65.5 | *1595 |
| S. M..... | Hoe..... | ..... | May | Nov. 13 | ..... | 1 | 1,082 | 17.8 | 13.3 | 74.6 | 1596 |
| ..... | ..... | ..... | ..... | ..... | Nov. 16 | 4 | 755 | 16.4 | 12.6 | 76.8 | 1606 |
| None..... | Hoe 2 ..... | 8½ | May 14 | Oct. 28 | Oct. 28 | Nov. 25 | 665 | 20.1 | 14.9 | 74.1 | 1557 |
| S. M. '97.. | Hoe 4 ..... | 13½ | 20 | ..... | ..... | 25 | 1,510 | 14.5 | 10.4 | 71.7 | 1558 |
| S. M. '97.. | H. 6, hoe 2 ... | ..... | 20 | ..... | Nov. 29 | Dec. 4 | 2,457 | 14.5 | 9.6 | 66.2 | *1607 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 390 | 23.7 | 21.5 | 90.7 | *1610 |
| None..... | H. 1, hoe 1 ... | 15 | ..... | Oct. 27 | ..... ..... ... | 11 | ..... | 21.0 | 16.2 | 77.1 | 1620 |
| | | | | | | | 889 | 18.2 | 14.3 | 78.5 | |
| None..... | Hoe 4 ..... | 11 | May 22 | Nov. 4 | Nov. 5 | Nov. 8 | 795 | 17 7 | 14.3 | 80.7 | 1417 |
| None..... | Hoe 4 ..... | 11 | May 22 | 4 | 5 | 9 | 870 1 | 20.8 | 16.3 | 78 3 | 1430 |
| S. M. '96.. | H. 4, hoe ..... | ..... | 20 | 5 | 8 | 10 | 690 | 19.6 | 13.0 | 73 8 | 1435 |
| S. M. '96-7 | Hoe 3 ..... | ..... | 1 | 2 | 10 | 15 | 450 | 20.5 | 15.3 | 74 6 | 1472 |
| ..... | ..... | ..... | 20 | ..... ..... | 23 | 24 | 750 | 16.5 | 12.2 | 73.9 | 1556 |
| | | | | | | | 711 | 18.6 | 14.3 | 76.8 | |
| ..... | ..... | ..... | Apr. 28 | Oct. 9 | Oct. 9 | Oct. 14 | 530 | 11.0 | 7.8 | 70.9 | *1104 |
| None..... | H. 1, hoe 1 ... | ..... | May 15 | 8 | 9 | 14 | 943 | 10.9 | 7.2 | 66.0 | *1105 |
| " ..... | H., hoe..... | 30 | 2 | 6 | 9 | 14 | 820 | 12 6 | 8.0 | 63.4 | *1106 |
| " ..... | Hoe 4 ..... | 24 | ..... | ..... | 9 | 14 | 2,326 | 10.0 | 8.2 | 82.0 | *1107 |
| S. M..... | Hoe..... | ..... | Apr. 20 | Oct. 9 | 9 | 14 | 1,958 | 10.0 | 5.0 | 50.0 | *1108 |
| None..... | H. 3 ..... | ..... | May 28 | ..... | 18 | 22 | 555 | 16.0 | 12.4 | 77.5 | 1189 |
| " ..... | Hoe..... | 20 | 4 | Oct. 7 | Nov. 1 | Nov. 3 | 640 | 11.8 | 7.5 | 63.5 | *1354 |
| ..... | ..... | ..... | ..... ..... | ..... ..... | Oct 14 | Oct. 15 | 293 | 10.9 | 7.1 | 65.1 | *1126 |
| S. M..... | Hoe.. ..... | 16 | May | Oct. 29 | Nov. 2 | Nov. 4 | 500 | 18.9 | 15.0 | 79.4 | 1362 |
| ..... | ..... | ..... | June 2 | Nov. 4 | 4 | 6 | 910 | 18.2 | 13.1 | 71.9 | 1413 |
| S. M. '96-7 | H. 3, hoe 2 ... | ..... | May 20 | Oct. 29 | ..... | 26 | 1,050 | 17.0 | 12.9 | 75.7 | 1565 |
| " | H. 3, hoe 2 .. | ..... | 20 | 29 | ..... | 26 | 1,136 | 18.9 | 14.4 | 76.2 | 1566 |
| " | H. 3, hoe 2 ... | ..... | 20 | 29 | ..... ..... | 29 | 1,139 | 19.1 | 14.2 | 74.3 | 1567 |
| | | | | | | | 947 | 18.2 | 13.9 | 76.2 | |
| ..... | ..... | ..... | ..... | ..... | Oct. 12 | Oct. 14 | 2,034 | 16.2 | 11.6 | 71.6 | 1110 |
| S. M. '97.. | Hoe 2 ..... | ..... | May 17 | Nov. 22 | 22 | 22 | 805 | 19.5 | 15.9 | 81.5 | 1194 |
| None..... | Hoe 1 ..... | ..... | 10 | Oct. 20 | 21 | 30 | 1,787 | 16.2 | 12.7 | 78.4 | 1277 |
| S. M. '96-7 | H. 4, hoe 3 ... | ..... | May | 22 | 33 | 30 | 1,421 | 14.4 | 9.5 | 66.0 | 1278 |
| S. M. '97.. | ..... | 14 | May 22 | 19 | 21 | 30 | 595 | 16.8 | 13 3 | 79.1 | 1279 |
| None..... | H. 3 ..... | 14 | 15 | 22 | 25 | 30 | 1,428 | 16.2 | 11.1 | 68.5 | 1280 |
| ..... | ..... | ..... | ..... | ..... | 23 | Nov. 1 | 325 | 19.3 | 14.6 | 75.1 | 1324 |
| None..... | ..... 1..... | 16.5 | May 10 | Nov. 16 | ..... | 11 | ..... | 13.8 | 9.4 | 68.1 | *1450 |
| " ..... | H. 2 ..... | 16 | 26 | 17 | ..... | Dec. 8 | 806 | 17.5 | 13.9 | 79.3 | 1616 |

TABLE I—DETAILED RESULTS OF SUGAR BEET

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1617 | Wm. B. Doner | Wabash | Mercer | Klein-Wanz | Dept. Agr. | Light sand |
| 1618 | " | " | " | Brabant | " | " |
| | Average, 10 samples. | | | | | |
| 1003 | Wm. W. Crane | Tipp. City | Miami | Klein-Wanz | Dept. Agr. | Brown, limestone |
| 1045 | " | " | " | " | " | " |
| 1089 | " | " | " | " | " | " |
| 1145 | " | " | " | " | " | " |
| 1146 | Fr'k Bowmaster | " | " | " | " | Yellow clay |
| 1271 | M. E. Eidemiller | Fidelity | " | Vilmorin | " | Sandy loam |
| 1356 | Wm. W. Crane | Tipp. City | " | | | |
| 1357 | Fr'k Bowmaster | " | " | | | |
| 1363 | Nathan Hill | Pleasant Hill | " | | Dept. Agr. | Yellow clay |
| 1364 | Thomas Pry | " | " | | " | Black |
| 1365 | Enoch Beery | " | " | | " | " |
| 1366 | W. Roudabaugh | " | " | | " | Red, gravelly |
| | Average, 12 samples. | | | | | |
| 1274 | A. H. Weaver | Miamisburg | Montgom'y. | | | |
| 1275 | Elwood Benner | " | " | | | |
| 1276 | J. C. Weaver | " | " | | | Garden |
| | Average, 3 samples. | | | | | |
| 1219 | C. Vandenbark | Zanesville | Muskingum. | | Dept. Agr. | Clay loam |
| 1253 | J. H. Mangold | " | " | Fr. White | J. D. Imlay | Sandy loam |
| 1406 | Joseph Love | Dresden | " | | | Sandy |
| 1436 | Frank Tingler | " | " | | Sec. Miller | Clay |
| 1538 | Chas. G. Quigley | " | " | | " | Sandy loam |
| | Average, 5 samples. | | | | | |
| 1162 | August Wangrin | Rocky Ridge | Ottawa | | | Black |
| 1188 | F. M. Gill | Port Clinton | " | | | Sandy loam |
| 1260 | Wm. Miller | Gypsum | " | | Sec. Miller | Sand and clay |
| 1301 | Mrs. B. F. Dwelle | " | " | Klein Wanz | Jericki Co | Sandy loam |
| 1302 | C. E. Foreman | " | " | | | Hard clay |
| 1355 | T. S. Johnson | " | " | | | |
| 1486 | The Clark Co | Clay Center | " | | | Black |
| 1487 | L. B. Bailey | Curtice | " | | | " |
| 1488 | " | " | " | | | |
| 1489 | O. B. Dean | " | " | | | Black |
| 1494 | A. F. Frese | Graytown | " | | | Black loam |
| 1593 | L. B. Bailey | Curtice | " | | | |
| 1597 | E. Dolph | Genoa | " | | | |
| | Average, 13 samples. | | | | | |
| 1152 | J. J. Brand | Paulding | Paulding | Klein-Wanz | | Black loam |
| 1258 | J. D. Bailey | Latty | " | " | | " |
| 1304 | S. M. Bailey | " | " | " | | Black, sandy loam |
| 1428 | Samuel Bowers | Paulding | " | " | | Clay and sand |
| 1479 | O. E. Wineman | Payne | " | | Grange | Black |
| 1553 | J. M. Anderson | Batson | " | | Sec. Miller | Black loam |
| 1582 | Israel Sells | McGil'l | " | | Dept. Agr. | Black sandy m'ck |
| 1583 | Samson Burger | " | " | | Grange | Yellow sand |
| 1584 | Israel Sells | " | " | | " | Dark clay |
| | Average, 9 samples. | | | | | |
| 1432 | F. M. Randolph | Somerset | Perry | | Dept. Agr. | Sandy loam |
| 1150 | James Porter | Leistville | Pickaway | | Dept. Agr. | Sandy loam |
| 1142 | C. H. McNeal | Waverly | Pike | | | Light loam |
| 1378 | W. G. Kent | Suffield | Portage | Fr. White | Sh'm & Gam | Sandy loam |
| 1411 | M. C. Sweet | Nelson | " | Fr. Red Top | Vaughn, Chi | Clay loam |
| | Average, 2 samples. | | | | | |
| 1090 | John Myers | Hector | Putnam | Klein-Wanz | Dept. Agr. | Elm clay |
| 1091 | A. R. Brower | Hector | " | " | " | Elm |
| 1092 | Geo. Reynolds | " | " | " | " | Black |
| 1093 | I. L. Varner | " | " | " | " | Dark sandy loam. |

INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| None | H. 2 | 16 | May 26 | Nov. 17 | | Dec. 8 | 844 | 16.4 | 13.6 | 82.9 | 1617 |
| " | " | 16 | 26 | 17 | | 8 | 785 | 18.5 | 16.0 | 84.7 | 1618 |
| | | | | | | | 1,119 | 17.1 | 13.2 | 77.2 | |
| None | H., hoe 1 | | May 17 | Oct. 16 | Sept. 15 | Sept. 17 | 727 | 14.0 | 11.1 | 79.4 | 1003 |
| " | " | | 17 | 16 | 30 | Oct. 2 | 1,140 | 16.3 | 12.3 | 75.4 | 1045 |
| " | " | | 17 | 16 | Oct. 9 | 13 | 645 | 18.2 | 13.2 | 72.5 | 1089 |
| " | " | | 17 | 16 | 16 | 19 | 878 | 17.2 | 14.0 | 81.4 | 1145 |
| S. M. '96 | | | 16 | 16 | 16 | 19 | 640 | 18.8 | 15.8 | 84.0 | 1146 |
| None | | | June 25 | 23 | 25 | 30 | 340 | 20.3 | 16.9 | 83.2 | 1271 |
| | | | | | | Nov. 3 | 656 | 17.2 | 13.9 | 80.7 | 1356 |
| | | | | | | 3 | 910 | 18.3 | 15.0 | 82.0 | 1357 |
| None | | | May 18 | Oct. 28 | | 4 | 500 | 14.6 | 10.3 | 70.5 | 1363 |
| S. M. | | | 20 | 26 | | 4 | 1,152 | 13.0 | 8.7 | 66.9 | 1364 |
| S. M. '96 | | | 15 | 28 | | 4 | 1,012 | 14.6 | 10.0 | 68.5 | 1365 |
| S. M. | Hoe 2 | | 25 | 28 | | 4 | 684 | 16.4 | 10.5 | 64.0 | 1366 |
| | | | | | | | 773 | 16.6 | 12.6 | 75.9 | |
| | H. 2, hoe 1 | | June 10 | Oct. 15 | Oct. 27 | Oct. 30 | 992 | 16.4 | 12.1 | 73.7 | 1274 |
| | Hoe 2 | | 1 | 21 | 27 | 30 | 905 | 16.9 | 12.4 | 73.4 | 1275 |
| | | | Aug. 1 | 21 | 27 | 30 | 370 | 15.1 | 10.9 | 72.2 | 1276 |
| | | | | | | | 755 | 16.1 | 11.8 | 73.3 | |
| S. M. | H. 3 | | May 13 | | Oct. 20 | Oct. 25 | 423 | 17.3 | 12.5 | 72.3 | 1319 |
| S. M. '96 | Hoe 2 | 5.3 | 15 | Oct. 25 | | 28 | 715 | 19.4 | 15.3 | 78.8 | 1253 |
| None | | | | Nov. 3 | Nov. 3 | Nov. 4 | 280 | 17.5 | 15.0 | 85.7 | 1406 |
| " | Hoe 1 | | 20 | Oct. 30 | 6 | 10 | 450 | 21.0 | 16.6 | 79.0 | 1436 |
| " | | | | Nov. 16 | 16 | 20 | 965 | 17.0 | 12.4 | 72.9 | 1538 |
| | | | | | | | 566 | 18.4 | 14.4 | 78.2 | |
| S. M. '96 | H. 3, hoe 3 | | May 25 | Oct. 10 | | Oct. 20 | 1,103 | 21.4 | 16.7 | 78.0 | 1162 |
| None | H. 2, hoe 2 | 22 | Ap'l 27 | 19 | Oct. 16 | 22 | 440 | 20.0 | 15.9 | 99.4 | 1188 |
| " | H. 4, hoe 1 | 15⅔ | May 15 | 23 | 28 | 29 | 490 | 19.1 | 15.6 | 81.7 | 1260 |
| " | Hoe | | 25 | 28 | 28 | Nov. 1 | 1,005 | 19.8 | 16.5 | 83.3 | 1301 |
| " | | 16 | Ap'l 29 | 29 | 29 | 1 | 492 | 18.1 | 13.8 | 76.2 | 1302 |
| | | | | | | 3 | 500 | 16.2 | 12.1 | 74.5 | 1355 |
| S. M. | Hoe | | May 1 | | | 17 | 758 | 21.8 | 18.7 | 85.8 | 1486 |
| | | 15 | 30 | Oct. 12 | | 17 | 601 | 20.3 | 16.3 | 80.2 | 1487 |
| | | | | | | 17 | 704 | 19.0 | 16.0 | 84.2 | 1488 |
| | | 14 | May 29 | Oct. 12 | | 17 | 639 | 19.8 | 15.8 | 79.8 | 1489 |
| | H. 1, hoe 2 | 18 | | Nov. 8 | | 17 | 626 | 19.6 | 13.9 | 78.9 | 1494 |
| | | | | | | Dec. 1 | 842 | 19.5 | 16.1 | 82.5 | 1593 |
| | | | | | | 1 | 924 | 19.5 | 16.7 | 85.6 | 1597 |
| | | | | | | | 694 | 19.9 | 15.7 | 78.8 | |
| None | Hoe | | June 3 | Oct. 12 | Oct. 12 | Oct. 19 | 345 | 20.0 | 15.7 | 78.4 | 1152 |
| | H. 2, hoe 1 | | May 29 | 25 | 27 | 29 | 527 | 19.5 | 16.2 | 83.1 | 1258 |
| None | Hoe | | 25 | 27 | 27 | Nov. 1 | 600 | 20.7 | 17.1 | 82.5 | 1304 |
| | " | | 17 | Nov. 4 | Nov. 6 | 9 | 353 | 23.3 | 20.4 | 87.5 | 1428 |
| None | " 3 | 18 | 28 | Oct. 28 | | 15 | 760 | 18.8 | 14.3 | 75.9 | 1479 |
| " | H. 2 | 13 | 24 | Nov. 16 | Nov. 22 | 24 | 835 | 19.6 | 16.2 | 82.7 | 1553 |
| " | Hoe 2 | 12 | June 1 | 22 | 25 | 29 | 1225 | 18.9 | 15.3 | 80.8 | 1582 |
| " | | 8 | 1 | Oct. 29 | 25 | 29 | 1020 | 18.2 | 13.9 | 76.2 | 1583 |
| S. M. | Hoe | 12 | May 28 | 25 | 25 | 29 | 1560 | 16.1 | 11.3 | 70.2 | 1584 |
| | | | | | | | 802 | 19.5 | 15.6 | 80.0 | |
| S. M. '96 | | | May 15 | Sept. 10 | | Nov. 9 | 127 | 23.6 | 19.1 | 80.9 | 1432 |
| None | Hoe 1 | | May 25 | Oct. 7 | Oct. 18 | Oct. 19 | 710 | 20.2 | 16.5 | 81.6 | 1150 |
| | | | | | | Oct. 19 | 595 | 18.0 | 14.0 | 77.8 | 1142 |
| S. M. | | | May 5 | | | Nov. 4 | 1650 | 13.8 | 9.6 | 69.6 | 1378 |
| S.M '96'97 | H. 2, hoe | 13 | May 24 | Oct. 30 | Oct. 30 | 6 | 1459 | 12.8 | 9.0 | 70.3 | 1411 |
| | | | | | | | 1554 | 13.3 | 9.3 | 69.7 | |
| None | | | June 10 | Oct. 2 | Oct. 5 | Oct. 14 | 1,217 | 16.0 | 11.6 | 72.5 | 1090 |
| " | | | May 14 | | 5 | 14 | 739 | 17.2 | 13.0 | 75.6 | 1091 |
| | | | 22 | Oct. 5 | 5 | 14 | 1,362 | 15.1 | 12.3 | 81.4 | 1092 |
| None | | | 15 | 4 | 4 | 14 | 937 | 18.2 | 13.9 | 76.3 | 1093 |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1094 | O. W. Stevens.... | Hector ..... | Putnam ..... | Klein-Wanz... | Dpt. Agr.... | Black elm..... |
| 1095 | Henry Beck ..... | " ..... | " ..... | " ... | " ... | Black sand..... |
| 1096 | Chas. Streite..... | " ..... | " ..... | " ... | " ... | Clay..... |
| 1097 | Frederick Miller. | " ..... | " ..... | " ... | " ... | Black loam ..... |
| 1098 | Geo. Gillott..... | " ..... | " ..... | " ... | " ... | " ..... |
| 1099 | A. T. Steiner..... | " ..... | " ..... | " ... | " ... | Clay and sand..... |
| 1100 | E. W. Dimmock.. | " ..... | " ..... | " ... | " ... | Sandy ..... |
| 1101 | L. J. Gaines..... | " ..... | " ..... | " ... | " ... | Dark sandy loam |
| 1102 | H. A. Troyer ..... | " ..... | " ..... | " ... | " ... | Black loam..... |
| 1103 | J. Kerns ..... | " ..... | " ..... | " ... | " ... | Elm ..... |
| 1255 | H. F. Rauh..... | Ottawa ..... | " ..... | ..... | ..... | ..... |
| 1267 | J. B. Schekelhoff | Brickner..... | " ..... | ..... | ..... | ..... |
| 1423 | S. Rekart..... | Fort Jennings | " ..... | Klein-Wanz... | Dpt. Agr.... | Black loam..... |
| 1511 | J. S. Hicks ..... | Cascade ..... | " ..... | ..... | Sec. Miller | River bottom..... |
| 1562 | E. C. Thrall..... | Hector ..... | " ..... | ..... | ..... | ..... |
| | Average, 19 samples. | | | | | |
| 1350 | John Corbett ..... | Lexington ..... | Richland..... | ..... | Sec. Miller | Sandy loam..... |
| 1351 | " ..... | " ..... | " ... | ..... | " | Sandy clay ..... |
| | Average, 2 samples. | | | | | |
| 1017 | W. V. Briggs ..... | Chillicothe ... | Ross..... | ..... | ..... | Light loam..... |
| 1018 | John Kaiser... . ... | " ... | " ..... | ..... | ..... | Rich garden ..... |
| 1019 | M. V. Briggs ..... | " ... | " ..... | ..... | ..... | Clay loam..... |
| 1020 | P. Kunkleman..... | " ... | " ..... | ..... | ..... | 2d bottom loam... |
| 1021 | W. Poland..... | " ... | " ..... | ..... | ..... | Very rich..... |
| 1082 | David Dillon ..... | " ... | " ..... | Dip. K. Wanz. | ..... | Black loam..... ... |
| 1083 | Philip Kinselman | " ... | " ..... | Orig K. Wanz. | ..... | Sandy loam..... |
| 1085 | Joseph James .... | " ... | " ..... | " | ..... | Rich sandy loam |
| 1086 | M. V. Briggs ..... | " ... | " ..... | ..... | California... | ..... |
| 1087 | Wm. Poland ..... | " ... | " ..... | ..... | ..... | Rich loam..... |
| 1088 | M. V. Briggs ..... | " ... | " ..... | ..... | ..... | ..... |
| 1141 | Wm. A. Wirt ..... | " ... | " ..... | ..... | ..... | ..... |
| 1143 | Mr. Hall ..... | " ... | " ..... | ..... | California... | ..... |
| 1144 | Randolph Donn... | " ... | " ..... | ..... | ..... | ..... |
| 1202 | Randolph Hughes | " ... | " ..... | ..... | ..... | Rich sandy loam |
| 1203 | David Barclay..... | E. Springfield | " ..... | ..... | ..... | Clay and sand ... |
| 1204 | Gottieib Muth ..... | Chillicothe ... | " ..... | ..... | ..... | " ... |
| 1205 | John Kaiser..... | " ... | " ..... | ..... | ..... | Limestone ridge.. |
| 1206 | Avertiser Co..... | " ... | " ..... | ..... | ..... | Rich garden..... |
| 1207 | Henry Dillman..... | " ... | " ..... | ..... | ..... | " ..... |
| 1325 | E. M. McBeth..... | " ... | " ..... | ..... | ..... | ..... |
| 1326 | M. V. Briggs..... | " ... | " ..... | ..... | California... | ..... |
| 1327 | P. Kinselman ..... | " ... | " ..... | ..... | ..... | ..... |
| 1328 | John A. Poland... | " ... | " ..... | ..... | ..... | ..... |
| 1330 | F. M. Nichols ..... | " ... | " ..... | ..... | California... | Heavy clay loam |
| 1331 | Wm. West..... | " ... | " ..... | ..... | ..... | ..... |
| 1568 | Scott Finley..... | Waller ..... | " ..... | ..... | ..... | ..... |
| 1569 | Wm. West..... | Chillicothe ... | " ..... | ..... | ..... | ..... |
| 1570 | M. V. Briggs..... | " ... | " ..... | ..... | ..... | ..... |
| 1571 | " ..... | " ... | " ..... | ..... | ..... | ..... |
| 1572 | Levi Jones..... | " ... | " ..... | Klein-Wanz... | ..... | Sandy loam..... |
| | Average, 30 samples. | | | | | |
| 1333 | F. B. Oberst..... | Fremont..... | Sandusky ..... | ..... | Sec. Miller | Black loam ..... |
| 1581 | Arthur Clark ..... | Clyde ..... | " ..... | Klein-Wanz... | Jericki Co... | ..... |
| 1611 | G. B. Fuller..... | " ..... | " ..... | " ... | " ... | Sandy..... |
| | Average, 2 samples. | | | | | |
| 1149 | A. W. Hull..... | Attica ..... | Seneca ..... | ..... | Sec. Miller | Black clay ..... |
| 1455 | John Holtz..... | Watson ..... | " ..... | ..... | " | Sandy gravel..... |
| 1527 | Dan Coppus..... | Fostoria ..... | " ..... | ..... | ..... | Clay..... |
| 1528 | Thom. B. Hartley | " ..... | " ..... | ..... | Sec. Miller | Black ..... |
| 1529 | A. Rainey. ..... | " ..... | " ..... | ..... | ..... | Clay..... |
| 1530 | E. Minick ..... | Bascom ..... | " ..... | ..... | ..... | Black ..... |
| 1531 | C. C. Cruger..... | " ..... | " ..... | ..... | ..... | Black loam ..... |
| 1573 | S. S. Ghaster ..... | Fostoria ..... | " ..... | Klein-Wanz... | Imported ... | ..... |
| 1574 | Ira Cadwallader. | " ..... | " ..... | " | Ferry & Co. | Sandy loam..... |
| 1579 | W. Strausberger | Republic..... | " ..... | ..... | ..... | ..... |
| | Average, 10 samples. | | | | | |
| 1344 | C. Shellenbarger | Jackson Cen. | Shelby ..... | ..... | ..... | Clay loam..... |
| 1345 | " | " | " ..... | ..... | ..... | ..... |
| 1346 | " | " | " ..... | ..... | ..... | ..... |
| 1352 | J. F. Scherer..... | " | " ..... | ..... | ..... | Clay..... |

BEET INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix, per cent. | Sucrose in juice, per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S. M. | | | May 21 | Oct. 2 | Oct. 4 | Oct. 14 | 817 | 17.4 | 13.8 | 79.3 | 1094 |
| None | | | 12 | 4 | 4 | 14 | 1,367 | 16.7 | 13.0 | 77.8 | 1095 |
| " | | | 26 | 4 | 4 | 14 | 525 | 16.6 | 12.8 | 77.1 | 1096 |
| " | | | 20 | 5 | 5 | 14 | 927 | 16.4 | 12.0 | 73.2 | 1097 |
| " | | | 15 | 5 | 5 | 14 | 714 | 16.7 | 12.5 | 74.8 | 1098 |
| " | | | 20 | 5 | 5 | 14 | 642 | 13.7 | 8.8 | 64.2 | 1099 |
| | Hoe 2 | 31 | 10 | 4 | 4 | 14 | 1,030 | 16.3 | 12.5 | 76.6 | 1100 |
| None | Hoe 3 | | 11 | 4 | 4 | 14 | 1,040 | 15.6 | 12.7 | 81.4 | 1101 |
| " | | | 20 | 5 | 5 | 14 | 837 | 15.8 | 11.8 | 74.9 | 1102 |
| " | | | 23 | 5 | 5 | 14 | 931 | 17.3 | 13.3 | 76.8 | 1103 |
| | | | | | | 28 | 1.348 | 17.8 | 13.5 | 75.7 | 1255 |
| None | | | May | | Oct. 27 | 29 | 1,722 | 16.7 | 13.2 | 79.1 | 1267 |
| " | | | May | Oct. 30 | Nov. 5 | Nov. 8 | 787 | 22.3 | 18.9 | 84.7 | 1423 |
| " | H. 1, hoe | | May | Nov. 12 | | 18 | 1,264 | 16 4 | 12.4 | 75.3 | 1511 |
| | | | | | | 25 | 1,200 | 22.5 | 19.5 | 86.6 | 1562 |
| | | | | | | | 958 | 17.1 | 13.1 | 76.5 | |
| None | | | May | | Nov. 1 | Nov. 3 | 533 | 20.2 | 16.5 | 81.6 | 1350 |
| S. M. | Hoe 3 | | May | | 1 | 3 | 460 | 19.5 | 15.7 | 85.6 | 1351 |
| | | | | | | | 496 | 19.9 | 16.6 | 83.4 | |
| | | | June 5 | Sept. 23 | Sept. 23 | Sept. 27 | 455 | 17.0 | 13.3 | 78.2 | 1017 |
| | | | 2 | | 23 | 27 | 905 | 14.0 | 10.2 | 73.6 | 1018 |
| | | | 1 | | 23 | 27 | 630 | 17.7 | 14.0 | 79.1 | 1019 |
| | | | May 25 | | 23 | 27 | 805 | 15 3 | 12 4 | 81.1 | 1020 |
| | | | | | 23 | 27 | 605 | 19.2 | 16.6 | 86.4 | 1021 |
| | | | June 5 | | Oct. 6 | Oct. 11 | 385 | 14.6 | 9.8 | 61.1 | 1082 |
| | | | | | | 6 11 | 835 | 17.3 | | | *1083 |
| | | | June 5 | | | 6 11 | 770 | 13.9 | 9.9 | 71.4 | 1085 |
| | | | | | | 6 11 | 610 | 19.0 | 13.8 | 72.6 | 1086 |
| | | | | | | 6 11 | 662 | 16.4 | 13.8 | 84.1 | 1087 |
| | | | | | | 6 11 | 432 | 17.8 | 13.1 | 73.5 | 1088 |
| | | | | | | 19 | 865 | 18 0 | 13.8 | 76.7 | 1141 |
| | | | | | | 19 | 525 | 20.6 | 15.7 | 76.2 | 1143 |
| | | | | | | 19 | 799 | 16.8 | 12 6 | 75.0 | 1144 |
| | | | June 1 | | | 23 | 958 | 15.5 | 11.9 | 76.6 | 1202 |
| | | | | | | 23 | 818 | 16.0 | 11.9 | 74.2 | 1203 |
| | | | | | | 23 | 1,168 | 15 6 | 11.0 | 70.5 | 1204 |
| | | | | | | 23 | 718 | 15.1 | 10.9 | 72.0 | 1205 |
| | | | June 1 | | | 23 | 678 | 14.9 | 11.1 | 74.0 | 1206 |
| | | | June 15 | | | 23 | 910 | 16.7 | 12.4 | 74.3 | 1207 |
| | | | | | Oct. 23 | Nov. 2 | 550 | 17.6 | 13.4 | 76.1 | 1325 |
| | | | | | | 2 | 560 | 19.7 | 14 7 | 74.6 | 1326 |
| | | | | | | 2 | 734 | 18.6 | 13.9 | 75.3 | 1327 |
| | | | June 20 | | | 2 | 313 | 13.9 | 10.3 | 74.1 | 1328 |
| None | Hoe 2 | 16 | May | | | 2 | 757 | 21.4 | 17.3 | 80.8 | 1330 |
| | | | | | | 2 | 667 | 20.8 | 16.0 | 77.0 | 1331 |
| | | | May 25 | | | 26 | 636 | 19.1 | 14 6 | 76.4 | 1568 |
| | | | | | | 26 | 790 | 21.0 | 17.1 | 81.4 | 1569 |
| | | | | | | 26 | 790 | 21.0 | 16.8 | 80.0 | 1570 |
| | | | | | | 26 | 785 | 20.1 | 16.8 | 83.6 | 1571 |
| | | | May 15 | | | 26 | 560 | 19.7 | 15.5 | 78.6 | 1572 |
| | | | | | | | 697 | 17.6 | 13.5 | 76.6 | |
| S. M. '96 | H., hoe | | May 20 | Oct. 28 | Oct. 30 | Nov. 20 | 650 | 20.1 | 17.3 | 86.1 | 1333 |
| | | | | Nov. 12 | | 29 | 975 | 17.0 | 12.3 | 72.3 | 1581 |
| S. M. '97 | H. 1, H | 25 | May 26 | Oct. 20 | Dec. 3 | Dec. 4 | 370 | 23 6 | 21.8 | 92.3 | *1611 |
| | | | | | | | 812 | 18.6 | 14.8 | 79.6 | |
| S. M. | H. | | June 12 | | Oct. 16 | Oct. 19 | 525 | 19.2 | 16.1 | 83.8 | 1149 |
| None | H. 2, hoe 1 | | May 13 | Nov. 6 | Nov. 9 | Nov. 13 | 587 | 20 4 | 16.3 | 80.0 | 1455 |
| | | | | | | 20 | 1,023 | 16.4 | 11.2 | 68.2 | 1527 |
| S. M. '96 | | | May | Nov. 1 | Nov. 1 | 20 | 1,268 | 19 5 | 15.0 | 76.9 | 1528 |
| | | | | | | 20 | 962 | 20.6 | 16.0 | 77.6 | 1529 |
| | | | | | | 20 | 233 | 17.7 | 14.6 | 82.5 | 1530 |
| | | | | | | 20 | 640 | 18.4 | 14.2 | 77.2 | 1531 |
| None | H. 3 | 16 | June 27 | Oct. 30 | Nov. 26 | 29 | 790 | 21 0 | 15 4 | 73.3 | 1573 |
| " | | 32 | May 15 | Nov. 20 | 20 | 29 | 772 | 19.5 | 15.0 | 76.9 | 1574 |
| | | | | | | 29 | 822 | 18.1 | 14.6 | 80.7 | 1579 |
| | | | | | | | 762 | 19.1 | 14.8 | 77.5 | |
| S.M. '96-7 | Hoe 1 | | May | Oct. 23 | Oct. 26 | Nov. 2 | 580 | 15.9 | 13.8 | 86.8 | 1344 |
| | | | | | 26 | 2 | 680 | 14.7 | 11.5 | 78.2 | 1345 |
| | | | | | 26 | 2 | 560 | 16.6 | 13.2 | 79.5 | 1346 |
| S. M. '96 | Hoe | | May | | Nov. 1 | 3 | 940 | 19.0 | 15.9 | 83.6 | 1352 |

TABLE I—DETAILED RESULTS OF SUGAR BEET

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1379 | C. Shellenbarger | Jackson Cen. | Shelby | | | |
| 1380 | " " | " " | " | | | |
| 1381 | " " | " " | " | | | |
| 1382 | J. F. Scherer | " " | " | | | |
| | Average, 8 samples. | | | | | |
| 1147 | L. G. Kelly | Alliance | Stark | | Sec. Miller | Sandy loam |
| 1225 | Christ Kuchner | Canton | " | | " | Muck |
| 1240 | Lycurgus Pfouts | Wilmot | " | | | Clay loam |
| 1245 | W. O. Grant | " | " | | | " |
| 1256 | C. J. Miller | Canal Fulton. | " | | Arm'r & Co | Gravelly clay |
| 1306 | Clayton Holl | New Berlin | " | Klein-Wanz | | Loamy |
| 1549 | W. Reeder | Marlboro | " | | Dpt. Agr | Clay loam |
| 1550 | Henry Scott | " | " | | " | Sandy l'm bot'tm |
| | Average, 8 samples. | | | | | |
| 1170 | R. J. Dallinga | Akron | Summit | Klein-Wanz | E. C. Thrall | Muck |
| 1171 | " " " | " | " | " | " | Sandy loam |
| 1172 | F. A. Wilcox | " | " | " | " | " |
| 1173 | F. F. Hancock | " | " | " | " | Clay loam |
| 1186 | D. W. Irish | Barberton | " | Fr. White | " | " |
| 1214 | T. G. Wylie | Fairlawn | " | Vilmorin | Dept. Agr | |
| 1235 | J. C. Baughman | Hamestown | " | | " | Gravelly sand |
| 1236 | Ira Hoffman | Akron | " | | " | |
| 1237 | Lute H. Miller | " | " | | | Loam |
| 1238 | Fred Swain | Sherman | " | Fr. White | Sn'd'r&Son | Clay loam |
| 1272 | A. Teeple | Akron | " | Vilmorin | Dept. Agr | Sandy loam |
| 1275 | " " " | " | " | French Red | Livingston | " |
| 1300 | H. Boughton | Bath | " | | Dept. Agr | Clay |
| 1332 | | Akron | " | | | |
| 1339 | C. A. Wildrcudt | " | " | Klein-Wanz | E. C. Thrall | Sandy loam |
| 1340 | Carl Straendune | " | " | " | Sch'm&Gam | " |
| 1341 | D. R. Baum | " | " | " | " | " |
| 1342 | M. Rothrock | " | " | Fr. White | " | " |
| 1343 | Amos Griffith | " | " | " | " | " |
| 1376 | Henry Squires | " | " | | | |
| 1377 | Mrs. Ritzman | " | " | | | |
| 1408 | Emil Gammeter | " | " | | Dept. Agr | Sandy loam |
| 1409 | S. K. Black | " | " | | " | " |
| 1419 | Ed. H. Rouweber | " | " | | Sec. Miller | " |
| 1424 | W. A. Miller | Loyal Oak | " | | Gam'ter Co | " |
| 1425 | S. S. Kepler | Summit | " | | | |
| 1442 | C. A. Hale | Ira | " | | | |
| 1519 | Lewis Cranz | " | " | | | |
| | Average, 23 samples. | | | | | |
| 1208 | Adam J. Best | P't W'sh'gt'n | Tuscaraw's | | Dept. Agr | Sand & clay |
| 1337 | Robert Harding | N. Philad'lp'a | " | | | |
| 1338 | Hiram Polan | " " | " | | | |
| 1513 | G. W. Helmick | Bakersville | " | | | Gravel |
| | Average, 4 samples. | | | | | |
| 1358 | Wm. Fulton | Bokes Creek | Union | | Sec. Miller | Clay |
| 1590 | E. C. Jackson | Peoria | " | | Dept. Agr | Sandy loam |
| | Average, 2 samples. | | | | | |
| 1004 | Joseph Mark | | Van Wert | | | |
| 1005 | Athy Cochenan | | " | | | |
| 1006 | T. W. Johnson | Hoaglin | " | | | Black loam |
| 1047 | Carter Maxwell | Van Wert | " | | | Black |
| 1048 | Henry Hipsher | " " | " | | | Clay |
| 1049 | Henry P. Holmes | Convoy | " | | | Black loam |
| 1050 | H. L. Allen | Van Wert | " | | | " |
| 1051 | " " | " " | " | | | |
| 1052 | John Switzer | Ohio City | " | Smith's Imp | | |
| 1053 | J. A. Crispen | Scott | " | | | |
| 1054 | F. E. Ferguson | Cavett | " | | | |
| 1055 | A. Cockenhour | Van Wert | " | | | |
| 1077 | James Lindeman | Delphos | " | | | |
| 1135 | " " | " | " | | Dept. Agr | Black loam |
| 1218 | Thomas Wade | " | " | | Sec. Miller | Black |
| 1495 | F. H. Cowley | Van Wert | " | | | |

INVESTIGATIONS IN OHIO FOR 1897—Continued.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average weight of beets. | Solids, in juice, °Brix, per cent. | Sucrose in juice, per cent. | Purity coefficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... | ..... | ..... | ..... | ..... | ..... | Nov. 4 | 330 | 17 7 | 13.2 | 74.6 | 1379 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 406 | 20.2 | 15.7 | 77.7 | 1380 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 315 | 20.1 | 16.5 | 82.1 | 1381 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 1,055 | 16.1 | 12.3 | 76.3 | 1382 |
| | | | | | | | 607 | 17.5 | 14.0 | 80.0 | |
| [Phos.'97 | | | | | | | | | | | |
| S. M. '96.. | H. hoe..... | 20 | May 15 | Oct. 20 | Oct. 15 | Oct. 19 | 500 | 21.0 | 17.7 | 84.2 | 1147 |
| None..... | ..... | 12.5 | 10 | 15 | 25 | 26 | 635 | 11.5 | 7.0 | 60.8 | *1225 |
| S. M. '97.. | ..... ..... | ..... | ..... | ..... | 26 | 28 | 795 | 18.6 | 14.9 | 80.1 | 1240 |
| ..... | ..... | 11 | ..... | ..... | 26 | 28 | 678 | 19.8 | 15.7 | 79.3 | 1245 |
| S. M. '96.. | H. 4, hoe 1 ... | ..... | May 10 | ..... | 27 | 28 | 1,451 | 18.1 | 14.5 | 81.1 | 1256 |
| ..... | ..... ..... | ..... | 24 | Oct. 25 | 30 | Nov. 1 | 530 | 20 5 | 17.4 | 84.9 | 1306 |
| S. M. '96.. | Hoe 4..... | 24 | 25 | Nov. 3 | ..... | 23 | 528 | 21.2 | 17.8 | 83.9 | 1549 |
| None..... | H. 3, hoe 2 ... | 13 | 18 | 10 | ..... | 23 | 579 | 21.0 | 17.5 | 83.3 | 1550 |
| | | | | | | | 712 | 18.9 | 15.3 | 80.8 | |
| C. Fer.'96 | Hoe 2 ..... | (?) | May 8 | Oct. 18 | Oct. 18 | Oct. 21 | 678 | 15.2 | 11.6 | 76 3 | 1170 |
| None..... | H. 2, hoe 1 ... | 14.5 | Apr. 11 | Nov. 18 | 18 | 21 | 728 | 19.6 | 16.9 | 86.2 | 1171 |
| S.M'96'97 | H. 1 ..... | 18 | May 15 | Oct. 14 | 15 | 21 | 237 | 20.4 | 17.8 | 87.2 | 1172 |
| S. M. '97.. | H. 2 ..... | 15 | 25 | 18 | 18 | 21 | 240 | 20.2 | 17.4 | 86.1 | 1173 |
| None..... | Shallow..... | 25 | 15 | 18 | 19 | 22 | 878 | 16.0 | 12.4 | 77.5 | 1186 |
| " ..... | H. hoe 2..... | ..... | June 1 | 20 | 20 | 25 | 597 | 19.4 | 15.6 | 80.4 | 1214 |
| Hen M.... | ..... | ..... | May | ..... | 22 | 27 | 534 | 18 8 | 16.1 | 85.6 | 1235 |
| ..... .... | Hoe 2 ..... | ..... | May | Oct. 20 | 20 | 27 | 1,080 | 11.7 | 8 9 | 76.0 | *1236 |
| S. M. '96.. | H. 2, hoe 2 ... | 15 | May 10 | 15 | 25 | 27 | 556 | 18.5 | 14.4 | 77.8 | 1237 |
| ..... | H. 3 ..... | ..... | 25 | 11 | ..... | 27 | 1,490 | 15.2 | 11.2 | 73.7 | 1238 |
| S. M..... | Hoe ..... | 21½ | May | 28 | Oct. 27 | 30 | 665 | 17.6 | 14 1 | 80.1 | 1272 |
| " ..... | Hoe ..... | ..... | May | 28 | 27 | 30 | 1,180 | 13.6 | 8.7 | 64.0 | *1273 |
| " ..... | Hoe ..... .... | .... | ..... | ..... | 29 | 30 | 450 | 18.3 | 14.8 | 80.0 | 1300 |
| ..... | ..... | ..... | ..... | ..... | ..... | Nov. 2 | 660 | 19.9 | 15.7 | 79.3 | 1332 |
| S. M..... | Hoe 2..... .... | 21 | May 25 | Oct. 25 | Oct. 30 | 2 | 668 | 18.9 | 15.8 | 83.6 | 1339 |
| None..... | None..... | ..... | 5 | 25 | 30 | 2 | 337 | 19.3 | 15.5 | 80.3 | 1340 |
| " ..... | Hoe 2 ..... | 15 | 11 | 30 | 30 | 2 | 483 | 19.4 | 16.7 | 86.1 | 1341 |
| ..... | Hoe 1 ..... | 16 | June | 26 | 30 | 2 | 426 | 14.8 | 11.5 | 77.9 | 1342 |
| S. M. '96.. | Hoe ..... .... | ..... | May 11 | 25 | 30 | 2 | 240 | 21.6 | 19.6 | 90.8 | *1343 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 1,080 | 13.2 | 10.0 | 79.8 | *1376 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 840 | 15.8 | 12.5 | 79.1 | *1377 |
| ..... | Hoe 1 ..... | ..... | June 5 | Nov. 4 | Nov. 4 | 6 | 607 | 18.6 | 14.5 | 79.8 | 1408 |
| ..... | ..... | ..... | 3 | ..... | 3 | 6 | 595 | 18 1 | 13.3 | 73.4 | 1409 |
| S.M'96'97 | H..... | 3 | May 19 | Nov. 2 | ..... | 8 | 832 | 17 3 | 14.3 | 82.5 | 1419 |
| S. M. '97.. | Hoe ..... | ..... | 1 | 4 | ..... | 9 | 990 | 16.8 | 13.1 | 77.8 | 1424 |
| ..... | ..... | ..... | ..... | ..... | ..... | 9 | 600 | 20.1 | 16 9 | 84 0 | 1425 |
| ..... | ..... | ..... | ..... | ..... | ..... | 10 | 1,520 | 18 6 | 14.7 | 78.9 | 1442 |
| ..... | ..... | ..... | ..... | ..... | ..... | 18 | 990 | 18.4 | 14.5 | 78 7 | 1519 |
| | | | | | | | 684 | 18.3 | 14 7 | 80.2 | |
| S.M'96'97 | H. 3, hoe 3 ... | ..... | May 20 | Oct. 7 | Oct. 22 | Oct. 23 | 783 | 19.3 | 15.5 | 80.2 | 1208 |
| ..... | ..... | ..... | ..... | ..... | 30 | Nov. 2 | 572 | 16.0 | 12 6 | 78.8 | 1337 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 665 | 20 7 | 17.0 | 82 1 | 1338 |
| S. M..... | ..... | ..... | ..... | Oct. 25 | ..... | 18 | 1,443 | 19.0 | 13.2 | 69.4 | 1313 |
| | | | | | | | 865 | 18.7 | 14.8 | 79.1 | |
| S. M. '97.. | H. hoe ... ..... | 10 | May 25 | Oct. 30 | ..... | Nov. 3 | 1,330 | 18.5 | 14.3 | 76.8 | 1358 |
| None..... | H. 2 ..... | ..... | June 6 | 31 | Nov. 3 | Dec. 1 | 824 | 21.0 | 17.5 | 83.3 | 1590 |
| | | | | | | | 1,077 | 19.7 | 15.9 | 80.6 | |
| ..... | ..... | ..... | May 25 | Sept.14 | Sept.14 | Sept.22 | 1,381 | 16.5 | 12.2 | 73.9 | 1004 |
| ..... | ..... | ..... | ..... | ..... | ..... | 22 | 826 | 13.0 | 8.3 | 63.8 | 1005 |
| ..... | H. 1 ..... .. | .... .. | May 26 | Sept.13 | Sept.13 | 22 | 555 | 16.4 | 12.0 | 73.2 | 1006 |
| ..... | Hoe 2..... .... | ..... | 7 | ..... | 30 | Oct. 2 | 1 001 | 16.6 | 11.7 | 70.4 | 1047 |
| ..... | H. 4 ..... | ..... | 15 | ..... | 30 | 2 | 1,451 | 14.1 | 11.0 | 78.0 | 1048 |
| ..... | H. 3 ..... | ..... | Apr. 15 | ..... | 30 | 2 | 906 | 15.1 | 10.7 | 70.8 | 1049 |
| ..... .... | Once a week | ..... .. | May 8 | ..... | 30 | 2 | 1,475 | 14.2 | 8.4 | 59.1 | *1050 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 1,560 | 15.1 | 10.2 | 67.5 | 1051 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 695 | 13.4 | 8.8 | 65.6 | *1052 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 1,120 | 16.8 | 10.7 | 63.6 | 1053 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 825 | 12.2 | 6.9 | 56.5 | *1054 |
| ..... | ..... | ..... | ..... | ..... | 30 | 2 | 1,316 | 11.5 | 6.5 | 56.5 | *1055 |
| ..... | ..... | ..... | ..... | ..... | ..... | 9 | 2,200 | 16.2 | ..... | ..... | *1077 |
| S. M..... | Hoe ..... | ..... | June 30 | Oct. 1 | Oct. 16 | 18 | 1,250 | 18.1 | 12.2 | 67.4 | 1135 |
| None..... | H..... | ..... | May 14 | 16 | 23 | 25 | 563 | 19.1 | 15.7 | 82.1 | 1218 |
| ..... | ..... ..... | ..... | ..... ..... | ..... | ..... | Nov. 17 | 935 | 21.0 | 16.0 | 76.1 | 1495 |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1496 | John Link | Cassella | Van Wert | | | |
| 1497 | J. M. Gardner | Van Wert | " | | | Clay loam |
| 1498 | J. W. Rumble | Scott | " | | | Black loam |
| 1499 | Hugh W. Evans | Delphos | " | | | |
| 1580 | J. D. Lare | Convoy | " | | Dpt. Agr. | Black loam |
| | Average, 15 samples | | | | | |
| 1000 | U. G. Sheets | Rittman | Wayne | | | [ond bottom Sandy loam, sec- |
| 1001 | W. H. Wright | " | " | | | Black bottom |
| 1002 | F. Kindig | " | " | | | Sandy loam |
| 1007 | J. B. Notestein | Canaan | " | | | " |
| 1008 | U. G. Sheets | Rittman | " | | | |
| 1022 | I. W. Kniestrick | Creston | " | | Sec. Miller | Sandy bottom |
| 1023 | " " " | " | " | Smith's Imp'd | | |
| 1024 | " " " | " | " | Vilmorin | | |
| 1025 | D. H. Harter | " | " | | | |
| 1026 | C. M. Zimmerman | Smithville | " | | | |
| 1027 | Austin Brant | " | " | | | |
| 1028 | E. Steel | Creston | " | | | |
| 1029 | C. G. Crane | " | " | | | |
| 1030 | C. Beal | " | " | | | |
| 1031 | I. Smith | " | " | | | |
| 1032 | Jordan Bros | " | " | | | |
| 1033 | M. McIlvaine | " | " | | | |
| 1034 | C. A. Stebbins | " | " | | | |
| 1035 | J. South | " | " | | | |
| 1036 | I. W. Kniestrick | " | " | | | |
| 1037 | J. B. Notestein | Canaan | " | | | |
| 1038 | P. Baum | Creston | " | | | |
| 1039 | C. A. Tenny | " | " | | | |
| 1040 | N. Owen | " | " | Vilmorin | | |
| 1041 | H. I. Freeman | " | " | | | |
| 1042 | C. C. Hughes | " | " | | | |
| 1043 | G. A. Hughes | " | " | | | |
| 1044 | David Zook | Sterling | " | | Dpt. Agr. | Rich sandy loam |
| 1046 | U. G. Sheets | Rittman | " | | | |
| 1064 | W. S. Flickinger | Creston | " | Vilmorin | | |
| 1065 | H. J. Freeman | " | " | | | |
| 1066 | N. Owen | " | " | | | |
| 1067 | A. J. Lance | " | " | | | |
| 1068 | P. Baum | " | " | | | |
| 1069 | C. A. Tenny | " | " | | | |
| 1070 | J. South | " | " | | | |
| 1071 | I. W. Kniestrick | " | " | | | |
| 1072 | J. B. Notestein | Canaan | " | | | |
| 1073 | C. G. Crane | Creston | " | | | |
| 1074 | G. A. Hughes | " | " | | | |
| 1075 | C. C. Hughes | " | " | | | |
| 1076 | D. E. McIlvaine | " | " | | | |
| 1078 | J. N. Boor | Madisonburg | " | | B. A. Hoffm'n | Sandy gravel |
| 1079 | C. M. Zimmerman | Smithville | " | | | |
| 1080 | U. G. Sheets | Rittman | " | | | |
| 1111 | Geo. Grab | Creston | " | | | |
| 1112 | C. C. Hughes | " | " | | | |
| 1113 | Isaac Smith | " | " | | | |
| 1114 | P. Baum | " | " | | | |
| 1115 | F. Ensinger | " | " | | | |
| 1116 | C. Beal | " | " | | | |
| 1117 | J. B. Notestein | " | " | | | |
| 1118 | Wm. Rhoer | Canaan | " | | | |
| 1119 | A. J. Lance | Creston | " | | | |
| 1120 | I. W. Kniestrick | " | " | | | |
| 1121 | Jordan Bros | " | " | | | |
| 1122 | C. A. Stebbins | " | " | | | |
| 1123 | C. G. Crane | " | " | | | |
| 1124 | D. E. McIlvaine | " | " | | | |
| 1128 | A. E. Keck | Marshallville | " | | Sec. Miller | Clay |
| 1129 | C. E. Warner | Wooster | " | | Dpt. Agr. | Clay loam |
| 1132 | U. G. Sheets | Rittman | " | | Cres. V. G. A. | Second bottom, [clay loam |
| 1133 | C. M. Zimmerman | Smithville | " | | | |
| 1140 | J. N. Boor | Madisonburg | " | | | |
| 1165 | Expt. Station | Wooster | " | | Sec. Miller. | Clay loam |
| 1166 | " | " | " | | " | " |
| 1167 | " | " | " | | " | " |
| 1168 | " | " | " | | " | " |
| 1195 | C. G. Crane | Creston | " | | " | Sandy loam |

BEET INVESTIGATIONS IN OHIO FOR 1897.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt of beets, grammes. | Solids in juice, °Brix, per cent | Sucrose in juice, per cent | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... | ..... | ..... | ..... | ..... | ..... | Nov. 17 | 1,098 | 16.6 | 11.2 | 67.4 | 1496 |
| ..... | H. 1 ..... | ..... | May 14 | ..... | ..... | 17 | 852 | 21.0 | 16.8 | 80.0 | 1487 |
| ..... | ..... | ..... | 22 | ..... | ..... | 17 | 1,244 | 18.1 | 13.1 | 72.3 | *1498 |
| ..... | ..... | ..... | ..... | ..... | ..... | 17 | ..... | ..... | ..... | ..... | 1496 |
| None..... | H. 2 hoe 1... | 10 | May 10 | Oct. 25 | ..... | 29 | 1,240 | 19.5 | 15.0 | 76.9 | 1580 |
| | | | | | | | 1,064 | 71.1 | 12.5 | 73.1 | |
| ..... | ..... | ..... | May 15 | ..... | Sept. 12 | Sept. 12 | 956 | 14.6 | 10.6 | 72.6 | 1000 |
| ..... | ..... | ..... | 28 | ..... | 12 | 12 | 2,050 | 11.8 | 8.0 | 67.8 | 1001 |
| ..... | ..... | ..... | 15 | ..... | 12 | 12 | 1,098 | 13.5 | 9.9 | 74.0 | 1002 |
| ..... | ..... | ..... | ..... | ..... | 20 | 22 | 499 | 16.0 | 12.7 | 79.3 | 1007 |
| None.... | ..... | ..... | ..... | ..... | 20 | 22 | 862 | 15.2 | 12.4 | 81.6 | 1028 |
| ..... | ..... | ..... | May 1 | ..... | 27 | 28 | 1,086 | 16.2 | 14.1 | 87.0 | 1022 |
| ..... | ..... | ..... | ..... | ..... | 27 | 28 | 1,070 | 11.6 | 10.4 | 89.7 | 1023 |
| ..... | ..... | ..... | ..... | ..... | 27 | 28 | 1,345 | 14.3 | 11.0 | 76 9 | 1024 |
| ..... | ..... | ..... | ..... | ..... | 27 | 28 | 660 | 17.0 | 3.5 | 79.4 | 1025 |
| ..... | ..... | ..... | ..... | ..... | 27 | 28 | 452 | 17.0 | 14.5 | 85.3 | 1026 |
| ..... | ..... | ..... | ..... | ..... | 27 | 28 | 1,545 | 14.9 | 10.2 | 68.4 | 1027 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 698 | 15.6 | 11.0 | 70.5 | 1028 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 558 | 17.3 | 13 9 | 80.3 | 1029 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 768 | 13.6 | 9.7 | 71.3 | 1030 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 468 | 16.7 | 14 5 | 85.7 | 1031 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 633 | 14.2 | 10.0 | 70.4 | 1032 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 675 | 17.1 | 13.1 | 76.6 | 1033 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 811 | 17.6 | 13.9 | 79.0 | 1034 |
| ..... | ..... | ..... | ..... | ..... | 29 | Oct. 1 | 508 | 16.6 | 12.0 | 72.2 | 1035 |
| ..... | ..... | ..... | ..... | ..... | 29 | 1 | 635 | 18.2 | 15.4 | 84.6 | 1036 |
| ..... | ..... | ..... | ..... | ..... | 29 | 1 | 555 | 17.8 | 13.9 | 78.1 | 1037 |
| ..... | ..... | ..... | ..... | ..... | 29 | 1 | 545 | 15.4 | 13 1 | 85.1 | 1038 |
| ..... | ..... | ..... | ..... | ..... | 29 | 1 | 598 | 17.2 | 13.0 | 75.6 | 1039 |
| ..... | ..... | ..... | ..... | ..... | 29 | Sept. 30 | 688 | 15 4 | 12.1 | 78.5 | 1040 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 886 | 17.0 | 13.5 | 79.4 | 1041 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 716 | 18.0 | 13.5 | 75.0 | 1042 |
| ..... | ..... | ..... | ..... | ..... | 29 | 30 | 903 | 14.1 | 10.0 | 70.9 | 1043 |
| S. M.. | ..... | ..... | ..... | Oct. 1 | Oct. 1 | Oct. 2 | 245 | 19.7 | 14.9 | 75.6 | 1044 |
| ..... | ..... | ..... | ..... | ..... | Sept. 30 | 2 | 940 | 16 1 | 11.6 | 72.0 | 1046 |
| ..... | ..... | ..... | ..... | ..... | Oct. 7 | 8 | 560 | 17.7 | 12.7 | 71.7 | 1064 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 808 | 16.9 | 13.5 | 79 8 | 1065 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 518 | 16.2 | 11.0 | 67.9 | 1066 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 461 | 16.7 | 12.7 | 76.0 | 1067 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 545 | 16.8 | 11.3 | 69.2 | 1068 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 488 | 18.2 | 11 6 | 63.7 | 1069 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 528 | 18.0 | 12.3 | 68.3 | 1070 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 761 | 17.5 | 12.3 | 70.2 | 1071 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 472 | 19.2 | 14.8 | 77.0 | 1072 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 828 | 18.0 | 13.9 | 77.2 | 1073 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 461 | 17.8 | 13.5 | 75.8 | 1074 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 566 | 19.0 | 15.4 | 81 0 | 1075 |
| ..... | ..... | ..... | ..... | ..... | 7 | 8 | 561 | 21.7 | 19.5 | 89.8 | 1076 |
| S. M. '96-7 | ..... | ..... | June 1 | Oct. 8 | 8 | 9 | 1,141 | 12.8 | ..... | ..... | *1078 |
| ..... | ..... | ..... | ..... | ..... | 9 | 9 | 340 | 20.0 | ..... | ..... | *1079 |
| ..... | ..... | ..... | ..... | ..... | ..... | 11 | 783 | 19.6 | ..... | ..... | *1080 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 521 | 19.3 | 16.1 | 83.4 | 1111 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 360 | 18.8 | 15.4 | 81 9 | 1112 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 490 | 15.4 | 13.5 | 87 6 | 1113 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 413 | 16.0 | 13.6 | 85.0 | 1114 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 605 | 19.5 | 17.0 | 87 2 | 1115 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 267 | 19.5 | 16.7 | 85.7 | 1116 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 506 | 17.9 | 14.7 | 82.1 | 1117 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 347 | 18.3 | 15.9 | 86.9 | 1118 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 468 | 17.6 | 14.9 | 84.6 | 1119 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 463 | 19.3 | 16.7 | 86.6 | 1120 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 667 | 17.7 | 14.9 | 84.2 | 1121 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 507 | 18.4 | 15.3 | 83.1 | 1122 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 785 | 17.6 | 15.2 | 86.4 | 1123 |
| ..... | ..... | ..... | ..... | ..... | 14 | 15 | 791 | 17.1 | 14.0 | 81.9 | 1124 |
| S. M. '96-7 | H., hoe..... | ..... | May 10 | ..... | 16 | 16 | 668 | 17.4 | 13.9 | 79.9 | 1125 |
| S. M. '96.. | Hoe ..... | ..... | 21 | Oct. 15 | 16 | 16 | 575 | 20.7 | 16.6 | 80.2 | 1126 |
| None..... | H. 3, hoe 3... | 14.5 | 15 | 15 | 15 | 16 | 915 | 18.2 | 15.3 | 84.1 | 1127 |
| ..... | ..... | ..... | ..... | ..... | 18 | 18 | 350 | 19 3 | 1.84 | 95.3 | *1128 |
| ..... | ..... | ..... | ..... | ..... | 19 | 19 | 1,309 | 12.0 | 8.3 | 69.0 | *1140 |
| ..... | ..... | ..... | ..... | ..... | 20 | 20 | 471 | 15.8 | 11.8 | 74.9 | 1165 |
| ..... | ..... | ..... | ..... | ..... | 20 | 20 | 540 | 17.1 | 13.7 | 80.1 | 1166 |
| ..... | ..... | ..... | ..... | ..... | 20 | 20 | 333 | 16.0 | 12.0 | 75.0 | 1167 |
| ..... | ..... | ..... | ..... | ..... | 20 | 20 | 160 | 16.6 | 12.8 | 77.1 | 1168 |
| ..... | ..... | ..... | ..... | ..... | 21 | 20 | 483 | 17.8 | 15.2 | 85.4 | 1195 |

TABLE I—DETAILED RESULTS OF SUGAR

| Laboratory number. | Name of grower. | Postoffice. | County. | Variety. | Source of seed. | Character of soil. |
|---|---|---|---|---|---|---|
| 1196 | D. E. McIlvaine | Creston | Wayne | | | |
| 1197 | H. Knepp | " | " | | | |
| 1198 | J. B. Notestein | Canaan | " | | | |
| 1199 | D. L. Zimmerman | Madisonburg | " | | Dpt. Agr. | Dark gravel |
| 1200 | Henry Herald | Mt. Eaton | " | | | |
| 1201 | Nathaniel Maury | Wooster | " | | Sec. Miller | |
| 1210 | Philip Baum | Creston | " | | Omaha, Neb. | Black sand |
| 1211 | " | " | " | | " | " |
| 1212 | " | " | " | | " | " [loam |
| 1234 | M. F. Kindig | Rittman | " | | Creston As'n | Gravel, sand, clay, |
| 1243 | G. S. Varnes | Mt. Eaton | " | | | Sandy |
| 1257 | Levi Snider | Shreve | " | | | |
| 1263 | D. H. Harter | Smithville | " | | Dpt. Agr. | Muck |
| 1264 | " | " | " | | " | Sandy |
| 1270 | W. W. Wallace | Wooster | " | Klein Wanz | | Clay |
| 1348 | Gordon Bros. | Creston | " | | Dpt. Agr. | Black sand |
| 1359 | Worth Herald | Mt Eaton | " | | | |
| 1367 | Station | Wooster | " | | | |
| 1407 | H. S. Hoff | Smithville | " | | | |
| 1414 | P. Baum | Creston | " | Klein Wanz | Omaha, Neb. | Black sand |
| 1521 | M. L. Rich | Smithville | " | | | |
| 1522 | D. H. Harter | " | " | | Sec. Miller | Sand, gravel loam |
| 1561 | J. H. King | Orrville | " | | | Black |
| 1598 | I. W. Knestrick | Creston | " | | | Sandy loam |
| 1599 | P. Baum | " | " | | Omaha, Neb. | Black, sandy |
| 1600 | I. W. Knestrick | " | " | | | |
| 1612 | Jacob A. Miller | Smithville | " | | | |
| 1615 | Allen H. Scott | Canaan | " | | Dpt. Agr. | Clay |
| | Average, 89 samples. | | | | | |
| 1191 | Jonas May | Bryan | Williams | | Sec. Miller | Black clay |
| 1490 | Fred. H. Behm | Riga | Lenawee, | Mich | | Black loam |
| 1552 | W. H. Newcomer | Bryan | Williams | | Dpt. Agr. | Black sand |
| | Average samples | | | | | |
| 1016 | A. Thurston | Grand Rapids | Wood | | | |
| 1063 | " | " | " | | | |
| 1081 | " | " | " | | | |
| 1136 | " | " | " | | | |
| 1385 | John Long | " | " | | | Clay |
| 1389 | E. Gill | Tontogany | " | Klein Wanz | | Black sandy loam |
| 1391 | C. F. Huffman | Grand Rapids | " | " | | Clay, black loam |
| 1394 | J. J. Black | Tontogany | " | " | | Black loam |
| 1397 | John McLain | Grand Rapids | " | " | | Sandy, bl'k loam |
| 1400 | John Long | " | " | | | Clay, black loam |
| 1431 | A. Thurston | " | " | | | |
| 1477 | Joseph Huffman | " | " | | | Clay |
| 1500 | C. W. Benschoter | " | " | | | Black muck |
| 1501 | F. L. Sheats | " | " | | | Sandy |
| 1541 | A. W. Nafus | " | " | | | Loam |
| 1543 | Chas. Rigg | " | " | | | Black loam |
| 1575 | Adan Beil | Haskins | " | | Dpt. Agr. | Black loam |
| 1576 | Robert Pickering | " | " | | " | Sandy loam |
| 1586 | J. S. Phillips | Tontogany | " | | | Black loam |
| 1601 | Wm. Digby | " | " | | | |
| 1602 | John Soash | " | " | | | |
| 1603 | H. W. Huebner | " | " | | | |
| 1604 | Ostin Taft | Weston | " | | | |
| 1605 | J. W. Reams | Tontogany | " | | | Black sand |
| 1608 | W. A. Watson | Grand Rapids | " | | | |
| 1609 | W. H. Hannah | Tontogany | " | | | Sandy |
| | Average, 24 samples. | | | | | |
| 1481 | S. P. Kail | U. Sandusky | Wyandot | | Sec. Miller | Sandy clay |

BEET INVESTIGATIONS IN OHIO—Concluded.

| Manuring. | Cultivation. | Calculated yield per acre, tons. | Date of planting. | Date of harvesting. | Date of sampling. | Date of analysis. | Average wt. of beets, grammes. | Solids in juice, °Brix. per cent. | Sucrose in juice. per cent. | Purity co-efficient. | Laboratory number. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... | ..... | ..... | ..... | ..... | Oct. 21 | Oct. 22 | 308 | 17.2 | 15.0 | 86.2 | 1196 |
| ..... | ..... | ..... | ..... | ..... | 21 | 22 | 810 | 16.8 | 14.5 | 86.2 | 1197 |
| ..... | ..... | ..... | ..... | ..... | 21 | 22 | 417 | 19.3 | 17.0 | 88.1 | 1198 |
| S. M. '96-7 | H., hoe..... | ..... | June 16 | Oct. 20 | 21 | 23 | 973 | 21.3 | 16.6 | 77.8 | 1199 |
| ..... | ..... | ..... | ..... | ..... | 21 | 23 | 755 | 17.6 | 14.5 | 82.3 | 1200 |
| ..... | ..... | ..... | ..... | ..... | 22 | 23 | 664 | 12.4 | 8.8 | 72.0 | *1201 |
| Ashes '96 | ..... | ..... | April 20 | ..... | 22 | 25 | 981 | 15.2 | 11.2 | 73.7 | 1210 |
| " | ..... | ..... | 20 | ..... | 22 | 25 | 507 | 16.5 | 12.7 | 77.3 | 1211 |
| " | ..... | ..... | 20 | ..... | 22 | 25 | 371 | 17.4 | 14.2 | 81.6 | 1212 |
| None..... | H. 2, hoe 2... | 8.25 | May 20 | Oct. 23 | 23 | 27 | 1,111 | 16.8 | 13.5 | 80.3 | 1234 |
| ..... | ..... | ..... | ..... | ..... | 26 | 28 | 650 | 18.1 | 14.3 | 79.0 | 1243 |
| ..... | ..... | ..... | ..... | ..... | 29 | 29 | 273 | 12.5 | 7.9 | 50.0 | *1257 |
| ..... | ..... | ..... | ..... | ..... | 29 | 29 | 1 676 | 16.3 | 13.2 | 81.0 | 1263 |
| ..... | ..... | ..... | ..... | ..... | 29 | 29 | 818 | 19.1 | 16.3 | 85.3 | 1264 |
| ..... | ..... | ..... | May 17 | ..... | 23 | 30 | 686 | 19.4 | 15.6 | 80.4 | 1270 |
| C. F. '97... | ..... | ..... | April 25 | Oct. 1 | 30 | Nov. 3 | 342 | 21.2 | 17.9 | 84.4 | 1348 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 575 | 15.7 | 12.2 | 77.7 | 1359 |
| ..... | ..... | ..... | ..... | ..... | Nov. 3 | 4 | 214 | 18.8 | 15.3 | 81.4 | 1367 |
| ..... | ..... | ..... | ..... | ..... | 4 | 4 | 506 | 19.9 | 19.1 | 85.9 | 1407 |
| Ashes '96 | ..... | 16.33 | April 21 | Nov. 4 | 5 | 6 | 245 | 19.8 | 16.4 | 82.8 | 1414 |
| ..... | ..... | ..... | ..... | ..... | ..... | 18 | 785 | 15.4 | 10.6 | 68.8 | 1521 |
| C. F. ..... | ..... | ..... | June 1 | ..... | Nov. 18 | 20 | 718 | 18.9 | 16.2 | 85.7 | *1522 |
| S. M. '97.. | ..... | ..... | ..... | ..... | ..... | 25 | ..... | 14.0 | 9.5 | 67.6 | 1561 |
| C. F. '97.. | H., hoe..... | ..... | May 6 | Nov. 3 | ..... | Dec. 1 | 647 | 17.7 | 15.4 | 87.0 | 1598 |
| Ashes '96 | ..... | ..... | April 21 | 4 | Nov. 29 | 1 | 502 | 17.4 | 15.0 | 86.2 | 1599 |
| ..... | ..... | ..... | ..... | ..... | ..... | 1 | 3,152 | 17.5 | 14.7 | 83.9 | 1600 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 307 | 16.8 | 13.3 | 79.0 | 1612 |
| S. M. '97.. | Hoe 2..... | ..... | May ..... | Nov. 15 | Dec. 7 | 8 | 633 | 19.0 | 14.7 | 77.2 | 1615 |
| | | | | | | | 787 | 17.2 | 13.9 | 80.7 | |
| S. M. '96.. | ..... | ..... | May 28 | Oct. 20 | Oct. 18 | Oct. 22 | 685 | 18.5 | 14.7 | 79.3 | 1191 |
| None... | H., hoe..... | 8 | June 2 | ..... | ..... | Nov. 17 | 1,687 | 21.0 | 17.3 | 82.3 | 1490 |
| S. M. '96.. | ..... | ..... | 1 | Nov. 6 | ..... | 23 | 567 | 21.0 | 16.6 | 79.0 | 1552 |
| | | | | | | | 979 | 20.2 | 16.2 | 80.2 | |
| ..... | ..... | ..... | ..... | ..... | Sept. 21 | Sept. 24 | 1,116 | 12.1 | 8.8 | 72.7 | 1016 |
| ..... | ..... | ..... | ..... | ..... | 30 | Oct. 4 | 1 081 | 14.6 | 9.6 | 65.7 | 1063 |
| ..... | ..... | ..... | ..... | ..... | Oct. 8 | 11 | 860 | 14.6 | ..... | ..... | *..... |
| ..... | ..... | ..... | ..... | ..... | 15 | 18 | 675 | 15.9 | 12.0 | 75.5 | 1136 |
| ..... | ..... | ..... | May 17 | ..... | ..... | Nov. 4 | 1,405 | 17.0 | 12.7 | 74.7 | 1385 |
| S. M. '97.. | Hoe 3..... | ..... | 12 | Oct. 14 | Oct. 14 | 4 | 1,130 | 16.7 | 12.8 | 76.6 | 1389 |
| S. M. '96.. | H., hoe..... | ..... | 13 | 22 | 22 | 4 | 1,400 | 18.8 | 14.5 | 77.0 | 1391 |
| None..... | H. 4, hoe 1... | 16 | 10 | 10 | 10 | 4 | 809 | 20.0 | 15.5 | 77.4 | 1394 |
| S. M. '97.. | H. 2, hoe 2... | ..... | 15 | 14 | 14 | 4 | 1,290 | 17.0 | 12.4 | 72.9 | 1397 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 990 | 20.6 | 16.5 | 80.0 | 1400 |
| ..... | ..... | ..... | ..... | ..... | Nov. 5 | 9 | 497 | 21.0 | 18.0 | 85.7 | 1431 |
| ..... | ..... | 14 | May 17 | Nov. 6 | 6 | 15 | 660 | 19.5 | 15.2 | 77.9 | 1477 |
| None..... | H. 2..... | 25 | 13 | 12 | 12 | 17 | 535 | 18.0 | 14.6 | 81.1 | 1500 |
| " ..... | H. 2, hoe 3... | ..... | June 1 | 3 | 3 | 17 | 455 | 16.9 | 13.0 | 76.9 | 1501 |
| " ..... | Hoe 2..... | ..... | 1 | 4 | 4 | 23 | 485 | 18.1 | 14.0 | 77.3 | 1541 |
| " ..... | H. 1, hoe 1... | ..... | May 28 | 20 | 20 | 23 | 580 | 15.8 | 12.2 | 77.2 | 1543 |
| " ..... | ..... | ..... | ..... | ..... | ..... | 29 | 885 | 23.4 | 19.6 | 84.6 | 1575 |
| S. M. '96.. | ..... | ..... | ..... | ..... | ..... | 29 | 620 | 22.3 | 18.4 | 81.6 | 1576 |
| ..... | Hoe 2..... | 15 | May 22 | Nov. 23 | Nov. 23 | 29 | 792 | 20.8 | 17.2 | 82.6 | 1586 |
| ..... | ..... | ..... | ..... | ..... | ..... | Dec. | 717 | 15.8 | 12.7 | 80.3 | 1601 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 450 | 21.0 | 17.2 | 81.9 | 1602 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 840 | 19.4 | 15.7 | 80.8 | 1603 |
| ..... | ..... | ..... | ..... | ..... | Nov. 29 | 4 | 435 | 17.8 | 14.2 | 79.8 | 1604 |
| ..... | Hoe 4..... | ..... | May 16 | Nov. 6 | ..... | 4 | 655 | 17.7 | 14.6 | 82.5 | 1605 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 160 | 19.2 | 15.7 | 81.7 | 1608 |
| None..... | ..... | ..... | May 27 | Nov. 10 | Nov. 10 | 4 | 495 | 23.7 | ..... | ..... | *1609 |
| | | | | | | | 777 | 18.4 | 14.4 | 78.3 | |
| S. M. '96.. | H..... | 11.5 | May ..... | Nov. 10 | Nov. 10 | Nov. 15 | 605 | 18.9 | 15.1 | 79.8 | 1481 |

While the results of all analyses of beets made during the season are given, several samples, designated by an asterisk, are omitted from the averages. Some of these are really not sugar beets. "Lane's Imperial," and "Smith's Improved," as returned in the variety column of the table, are excluded in all cases; likewise, certain abnormal samples. The lack of purity in seed was shown by samples of red beets grown from that marked Klein Wanzlebener. In addition to the cases just stated, wilted samples and dried samples were frequently received during the latter part of the season. These gave usually very high percentages of sugar, because of the great loss of water that had taken place, and they were accordingly excluded. The very early samples, September 12 and 15, should also be omitted, since the averages are prepared to show the mean composition of Ohio sugar beets during the period from first maturity to early December.

In Table I, we have endeavored to give as much of the essential data as possible, and to make it easy for each grower to refer to the analyses of his own samples as well as those of his neighbors. This great amount of detail renders the table too cumbersome for ready reference. In the tables which follow an effort has been made to answer a part of the many questions suggested to one studying the beet sugar industry in Ohio. A general summary is given in Table II. The results obtained at different dates are in Table III; this is especially designed to answer the question "when may we expect Ohio sugar beets to be sufficiently mature to begin the manufacture of sugar and when at their best?" Soil conditions are studied in Table IV. It will perhaps be possible in another year to take up the question of beet storage in pits or silos. Table II shows summary of samples and analyses for the various counties, the three sections of Ohio and the whole state. It includes only the samples admitted to the averages.

TABLE II—SHOWING SUMMARY OF TABLE I.

| County. | Number of samples. | | Average weight of beets, grammes. | Total solids in juice, per cent. | Sucrose in juice, per cent. | Purity, coefficient. |
|---|---|---|---|---|---|---|
| | Analyzed. | In average. | | | | |
| Ashland | 4 | 4 | 831 | 16 7 | 12.7 | 76.0 |
| Ashtabula | 2 | 2 | 679 | 18.0 | 14.9 | 82.8 |
| Auglaize | 9 | 6 | 1,128 | 18.7 | 14.4 | 77.0 |
| Belmont | 1 | 1 | 660 | 19.1 | 16.6 | 86.9 |
| Champaign | 1 | 1 | 825 | 17.0 | 13.2 | 77.6 |
| Clark | 11 | 11 | 610 | 17.9 | 14.1 | 78.7 |
| Columbiana | 1 | 1 | 610 | 22.0 | 18.4 | 83 6 |
| Coshocton | 4 | 4 | 860 | 17.7 | 12.9 | 72.9 |
| Crawford | 7 | 7 | 1,095 | 17.9 | 13.8 | 77.1 |
| Cuyahoga | 4 | 4 | 894 | 17.1 | 12.9 | 75.5 |
| Darke | 44 | 44 | 864 | 17 3 | 13.3 | 76.9 |
| Defiance | 23 | 23 | 851 | 17.6 | 13.7 | 77.9 |
| Delaware | 4 | 4 | 559 | 18.8 | 14 9 | 79.3 |
| Erie | 1 | 1 | 1,406 | 18.6 | 15.0 | 80.6 |
| Fairfield | 5 | 5 | 599 | 17.1 | 12.8 | 74.9 |
| Fayette | 2 | 2 | 620 | 18.5 | 14.6 | 78.9 |
| Franklin | 5 | 5 | 524 | 19.1 | 15.3 | 80.0 |
| Fulton | 24 | 24 | 1,065 | 17.8 | 14.1 | 79.2 |
| Geauga | 6 | 6 | 694 | 19.2 | 16.3 | 84 8 |
| Greene | 11 | 11 | 1,285 | 14.8 | 9.9 | 66.8 |
| Hardin | 4 | 3 | 796 | 16.3 | 12.1 | 74.2 |
| Henry | 33 | 25 | 810 | 18.9 | 15.3 | 80.9 |
| Highland | 1 | 1 | 840 | 19.3 | 13.2 | 68.4 |
| Hocking | 1 | 1 | 1,521 | 12.2 | 7.2 | 59.0* |
| Holmes | 6 | 6 | 680 | 16.8 | 13.6 | 81.0 |
| Huron | 1 | 1 | 303 | 21.0 | 16.0 | 76 1 |
| Knox | 4 | 2 | 642 | 19.4 | 15.9 | 81.9 |
| Lake | 5 | 3 | 789 | 18.0 | 14.9 | 82.7 |
| Licking | 11 | 10 | 562 | 15.9 | 11.9 | 74.9 |
| Logan | 2 | 2 | 779 | 16.1 | 12.8 | 80.0 |
| Lorain | 1 | 1 | 520 | 19.7 | 16.0 | 81.2 |
| Lucas | 32 | 30 | 889 | 18.2 | 14.3 | 78.5 |
| Madison | 5 | 5 | 711 | 18.6 | 14.3 | 76.8 |
| Marion | 7 | 1 | 555 | 16.0 | 12.4 | 77.5 |
| Medina | 6 | 5 | 947 | 18.2 | 13.9 | 76.2 |
| Mercer | 11 | 10 | 1,119 | 17.1 | 13.2 | 77.2 |
| Miami | 12 | 12 | 773 | 16.6 | 12.6 | 75.9 |
| Montgomery | 3 | 3 | 755 | 16.1 | 11.8 | 73.5 |
| Muskingum | 5 | 5 | 566 | 18.4 | 14.4 | 78.2 |
| Ottawa | 13 | 13 | 694 | 19.9 | 15.7 | 78.8 |
| Paulding | 9 | 9 | 802 | 19.5 | 15 6 | 80.0 |
| Perry | 1 | 1 | 127 | 23.6 | 19.1 | 80.9 |
| Pickaway | 1 | 1 | 710 | 20.2 | 16.5 | 81.6 |
| Pike | 1 | 1 | 595 | 18.0 | 14.0 | 77.8 |
| Portage | 2 | 2 | 1 554 | 13.3 | 9.3 | 69.7* |
| Putnam | 19 | 19 | 958 | 17.1 | 13.1 | 76.5 |
| Richland | 2 | 2 | 496 | 19 9 | 16.6 | 83.4 |
| Ross | 31 | 30 | 697 | 17.6 | 13.5 | 76.6 |
| Sandusky | 3 | 2 | 812 | 18 6 | 14.8 | 79.6 |
| Seneca | 10 | 10 | 762 | 19.1 | 14.8 | 77.5 |
| Shelby | 8 | 8 | 607 | 17.5 | 14.0 | 80.0 |
| Stark | 8 | 8 | 712 | 18.9 | 15.3 | 80.8 |
| Summit | 28 | 23 | 684 | 18.3 | 14.7 | 80.2 |
| Tuscarawas | 4 | 4 | 865 | 18.7 | 14.8 | 79.1 |
| Union | 2 | 2 | 1,077 | 19.7 | 15.9 | 80.6 |
| Van Wert | 21 | 15 | 1,064 | 17.1 | 12.5 | 73.1 |
| Wayne | 97 | 89 | 787 | 17.2 | 13.9 | 80.7 |
| Williams | 3 | 3 | 979 | 20.2 | 16.2 | 80.2 |
| Wood | 26 | 24 | 777 | 18.4 | 14.4 | 78.3 |
| Wyandot | 1 | 1 | 605 | 18.9 | 15.1 | 79.8 |
| Southern section | 69 | 67 | 892 | 17.0 | 12 8 | 75.3 |
| Middle section | 146 | 132 | 924 | 17.8 | 13.9 | 78.0 |
| Northern section | 392 | 355 | 834 | 18.0 | 14.3 | 79.4 |
| Entire State | †607 | 554 | 867 | 17.8 | 14.0 | 78.7 |

*Not included in averages of State.

†Some samples were received without name or address.

## TABLE III—ANALYSES OF SUGAR BEETS AT DIFFERENT DATES.

### A—By Growers.

| Dates of Sampling. | Grown by U. G. Sheets Rittman, Wayne Co. | | Grown by C. G. Crane, Creston, Wayne Co. | | Grown by W. W. Crane, Tippecanoe City, Miami Co. | | From Azor Thurston, Grand Rapids, Wood Co. | | Grown by Jonas Dininger, Greenville, Darke Co. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Per cent. sucrose in juice. | Purity co-efficient. | Per cent. sucrose in juice. | Purity co-efficient. | Per cent. sucrose in juice. | Purity co-efficient. | Per cent. sucrose in juice. | Purity co-efficient. | Per cent sucrose in juice. | Purity co-efficient. |
| September 12–15 | 10.6 | 72.6 | | | 11.1 | 79.4 | | | | |
| September 17–20 | 12.4 | 81.6 | | | | | 8.8 | 72.7 | 12.8 | 82.6 |
| September 30 | 11.6 | 72.0 | 13 9 | 80.3 | 12.3 | 75.4 | 9.6 | 65.7 | | |
| October 7-9 | | | 13.9 | 77.2 | 13.2 | 72.5 | | | | |
| October 15–16 | 15.3 | 84.1 | 15.2 | 86 4 | 14.0 | 81.4 | 12.0 | 75.5 | { 17.0<br>{ 14.9 | 82.5<br>78.4 |
| October 20 | | | 15.2 | 85.4 | | | | | | |
| November 3-5 | | | | | 13.9 | 80.7 | 10.0 | 85.7 | | |
| November 18 | | | | | | | | | 16.2 | 85.3 |

### [TABLE III] B—By Counties.

| Dates. | Wayne County. | | | Ross County. | | | Darke County. | | | Henry County. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. | No. Samp's | Per cent sucrose in juice | Purity co-efficient | No. Samp's | Per cent. sucrose in juice | Purity co-efficient. |
| September 17-20 | 2 | 12 5 | 80.5 | | | | 7 | 11.7 | 78 0 | | | |
| September 23–October 1 | 22 | 12.8 | 76 2 | 5 | 13 3 | 80.1 | 4 | 10 7 | 69 5 | | | |
| October 6-7 | 13 | 13.4 | 74 3 | 6 | 12 3 | 74.4 | | | | | | |
| October 14-16 | 16 | 15 2 | 82.6 | | | | 12 | 14 4 | 78.6 | | | |
| October 25 and 20 to 30 | 8 | 14.0 | 81.9 | 6 | 11.5 | 73.7 | | | | 5 | 15.2 | 78 4 |
| November 1–15 | | | | 6 | 14.4 | 76 2 | | | | 12 | 14.5 | 81.8 |
| November 15-December 1 | | | | 5 | 16 6 | 82.2 | | | | 8 | 16.6 | 83.8 |
| September | 27 | 12.1 | 80.4 | 5 | 13.3 | 80.1 | 7 | 11.6 | 76.8 | | | |
| October | 47 | 14.2 | 79.0 | 6 | 11.9 | 73 8 | 26 | 13 4 | 77.5 | 5 | 15.2 | 78 4 |
| November | 13 | 14.7 | 82.5 | | 15.4 | 79 0 | 11 | 14.5 | 79.2 | 20 | 15.3 | 82.2 |

The striking differences in purity co-efficient between October 10 and 14 is thought to be explained by the fair showers which fell upon October 12, over much of the State.

TABLE IV—SAMPLES FROM DIFFERENT SOILS.

| Character of Soil | Darke County. | | | Fulton County. | | | Miami County. | | | Summit County. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. | No. Samp's | Per cent. sucrose in juice. | Purity co-efficient. |
| Black and black loam | 3 | 11.7 | 74.8 | 3 | 17.2 | 86.0 | | | | | | |
| Black sand and black sandy loam | 3 | 13 6 | 79.5 | 4 | 13.1 | 78.3 | | | | 1 | [1]16.9 | 86.2 |
| Light and yellow sand | | | | 7 | 13 5 | 77.0 | | | | | | |
| Clay | 9 | 14.3 | 78.9 | | | | 2 | 15.4 | 82.8 | | | |
| Black limestone | | | | | | | 2 | 14.0 | 81 4 | | | |
| Muck | | | | | | | | | | 1 | [1]11.6 | 76 3 |
| Muck—Av'g of samples from 4 counties | | | | | | | | | | 5 | 11.2 | 73.7 |

It certainly appears of no use to plant sugar beets upon muck. The other results of the table are conflicting to a certain extent. On the whole, the beets from clay soils appear to show a higher per cent. of sugar. [1]These two samples were from the same farm and seed, No. 1170 and 1171.

## GENERAL DISCUSSION OF RESULTS.

Taken as a whole, these analyses seem to indicate that beets of good quality may be grown in most counties of the middle and northern sections of Ohio, and further, that many portions of the southern section may be adapted to sugar beet growing, although on the whole less promising than more northerly districts. The analyses from Fayette, Pickaway, Ross, Pike and Perry counties appear encouraging. The sugar content in Ross county is decidedly reassuring, though the purity is slightly below the standard. Judging by the samples, this might have been greatly improved by more careful culture and better selection of typical specimens. The unfavorable results in Greene and Montgomery counties are not taken to indicate what may really be done in these counties. For the southern section, and particularly the valley districts, further trials should be made. Close planting should be practiced on rich lands.

For the middle section, as a whole, good sugar beets may apparently be grown when growers have learned what to avoid in planting and culture. The low averages in samples from Mercer, Hardin and Coshocton counties may not certainly be taken as conclusive evidence of conditions unfavorable to sugar beet culture. Those reported from sandy soils in Mercer county show a fair purity. The results from Belmont, Muskingum and Tuscarawas counties point to better things in the eastern counties than has been previously anticipated. More trials in this region another year are certainly warranted by these analyses.

As anticipated from previous trials, it is the northern section which makes the most favorable showing as a whole. Samples were received from every county of the northern section except Trumbull, Mahoning, Hancock and Allen. A sample was received from Columbiana county after the tables had been completed. While the lake shore district shows to good advantage here, the counties situated along the summer isothermal of 70° F. (see Map I) are but slightly if at all inferior, though represented by a much larger number of samples. Ottawa county gives a low purity with a high sugar content,—15, 7%. It will be noted that a large number of samples is not conducive to extremely high averages in the tables.

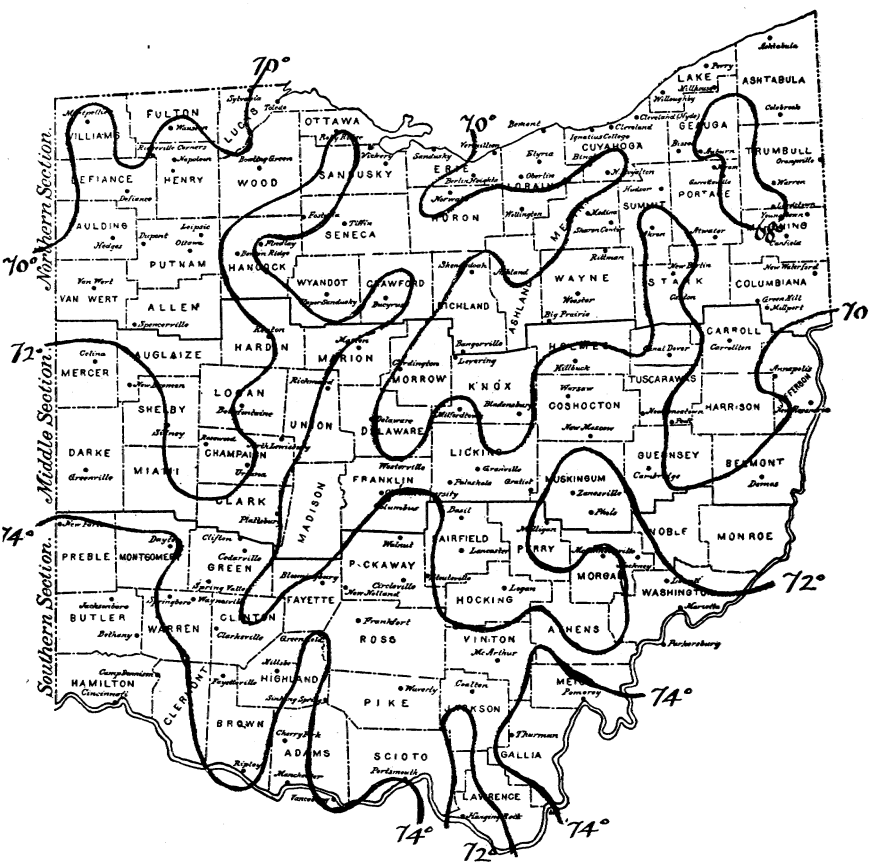
In fact practically all the counties of the State show a rather high sugar content—fourteen per cent. in juice when all are averaged—and it is to the coefficient of apparent purity that we must direct our attention to discover differences. The averages are seen in Table II. Under all the circumstances an average purity of 78 and above may be taken as fairly satisfactory for the present year's analyses.

It is to be borne in mind, when these results are considered, that the percentages were obtained for the most part in comparatively fresh samples, from which only the leaves had been removed. Topping the beets, as for factory use, was not encouraged, owing to the risk of water

loss by evaporation. This has led, possibly, to lower percentages than where beets were topped and sent considerable distances by mail. While the actual sugar content would be but slightly, if at all, reduced by loss of water, the apparent sucrose per cent. would be changed.

## OHIO CLIMATE AND SUGAR BEET CULTURE.

Through the co-operation of H. W. Richardson, Section Director of the Weather Service, Columbus, Ohio, we are able to present a series of maps showing normal meteorological conditions during the months of June, July, August and September. These are the result of a long series



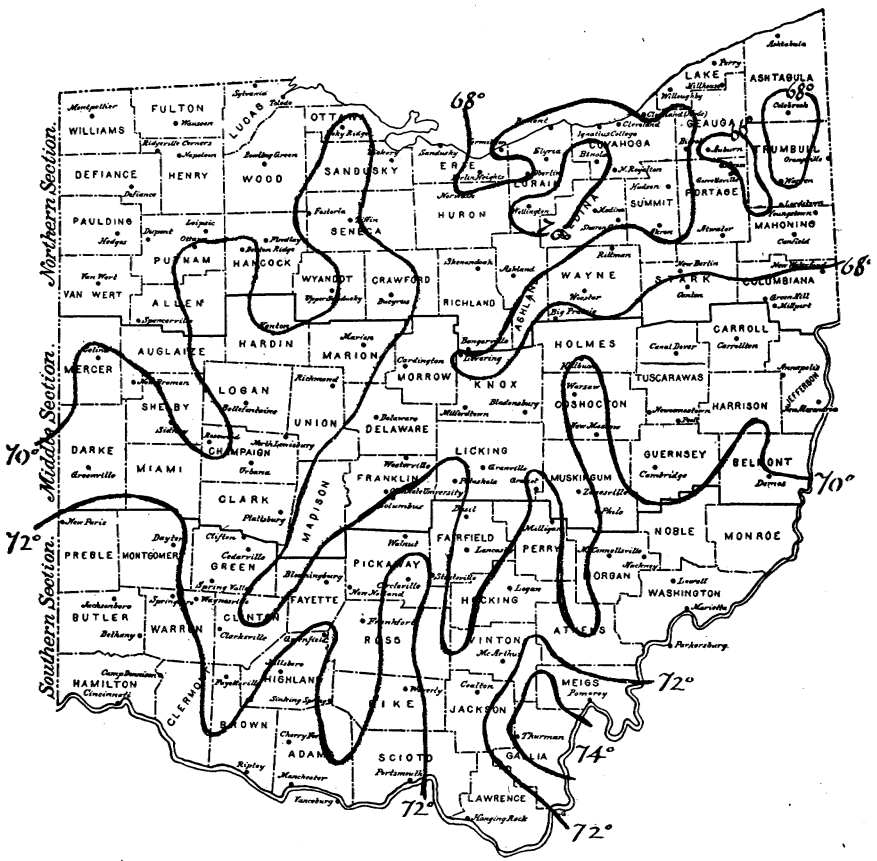

MAP 1. Showing normal or average isotherms in Ohio, for fifteen years—June, July and August combined.

of observations—15 years— and represent, likewise, a large amount of labor by Mr. Richardson. The preparation of the isothermal charts was suggested as promising interesting data; the rainfall charts were prepared by him to accompany them and for the same periods. These, we

*3 Ex. Sta. Bul. 90.

believe, are the first isothermal maps of Ohio, for the summer months, that have yet been published. It is desired to express our obligations to Mr. Richardson for this valuable service.

The following letter from Mr. Richardson, sent with the charts, will throw some light on the meteorological aspects of them:



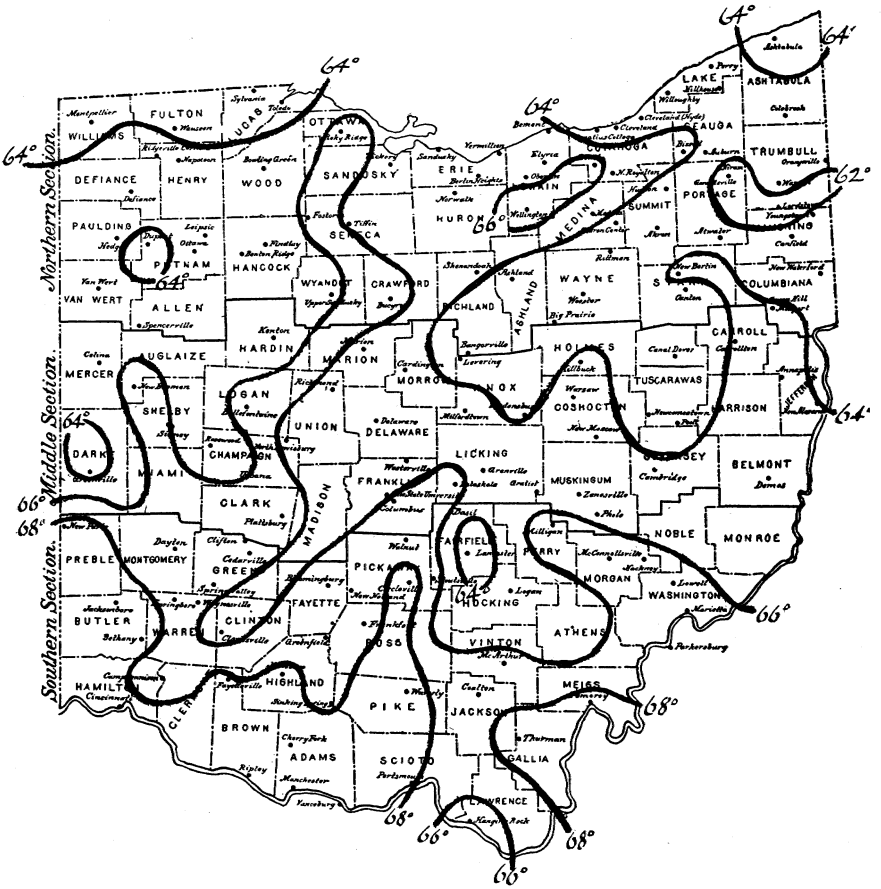

MAP 2. Showing normal or average isotherms in Ohio, for fifteen years—June, July, August and September combined.

COLUMBUS, O., December, 16, 1897.

PROF. A. D. SELBY, Agricultural Experiment Station, Wooster, O.

MY DEAR SIR: Agreeably to your request of recent date I enclose herewith average or normal temperature charts for June, July and August (combined), June, July, August and September (combined), and for September, covering Ohio, and representing averages for past fifteen years. In addition to these I also enclose charts showing average total precipitation for the above mentioned months, and in the same combinations, thinking that such additional data might prove of value to you in this matter of sugar beet culture, and in other ways regarding future investigations. I combined the September chart, showing both temperature and rainfall,

but did not combine these conditions for other months, as I thought it might prove confusing. You will find, however, that there are three separate charts of temperature as desired. Note the similarity of 72° isotherm in three-month combination to the 70° isotherm in four-month combination, and the 66° isotherm in September. Note also the slightly lower temperature conditions over Jackson and Lawrence counties, and the slightly higher temperature conditions in southern Lorain and western Cuyahoga counties, as compared with surrounding districts, also the cooler conditions over Trumbull and Mahoning counties. In the three months of summer, in the western half of the state, the isotherm of 70° follows quite closely the line showing average total rainfall of 10 inches. In the eastern half of the state, for the same period, the isotherms of 70° and 72° coincide (to a certain extent) with



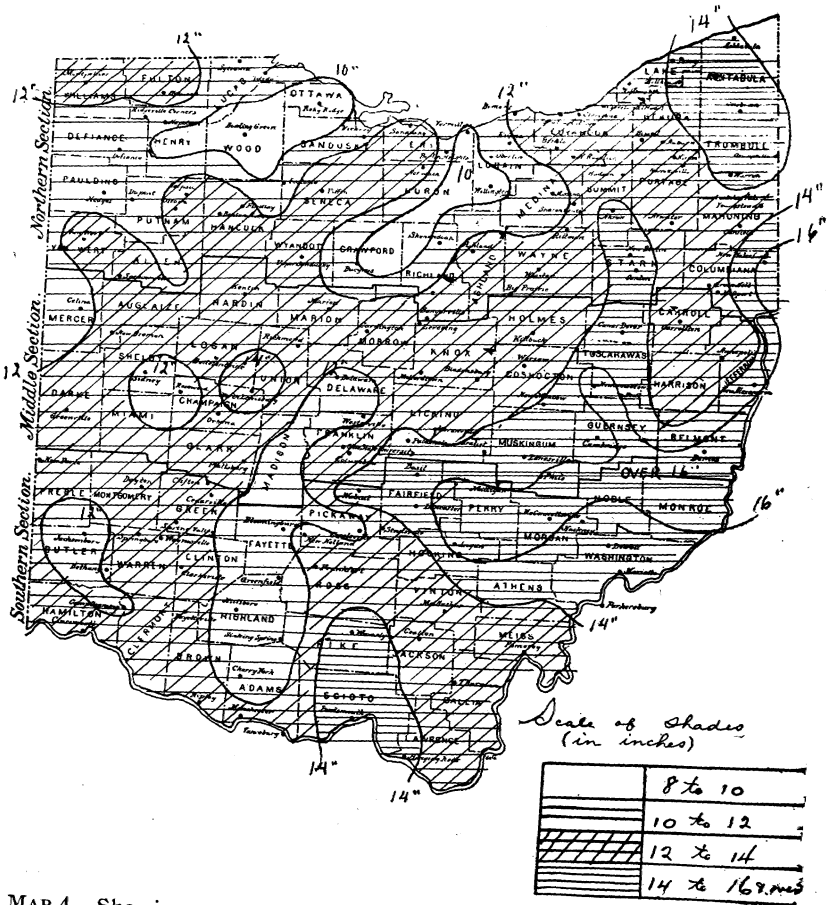

MAP 3. Showing normal or average isotherms in Ohio for fifteen years—September only.

the rainfall lines averaging 10 and 12 inches, respectfully. In the four-month combination, in the western half of the state, the isotherm of 70° appears coincidental with line showing average total rainfall of 12 inches, and in the eastern half it dips into somewhat heavier rainfall conditions. I mention these facts in order that you may be assisted in your study of conditions mentioned. I am sorry that I did not have the time to give the matter more detailed study, as I am sure

many interesting deductions can be made from the careful examination of charts mentioned. Hoping that what I have given herewith will be found satisfactory, and assuring you that it will be a pleasure to respond in like manner in the future, I am,

Yours very sincerely,
(Signed) H. W. RICHARDSON,
Section Director.

It has been held than a mean temperature of 70° F. for the summer months, June, July and August (combined) is conducive to the best development of the sugar beet, provided there is also adequate rainfall.

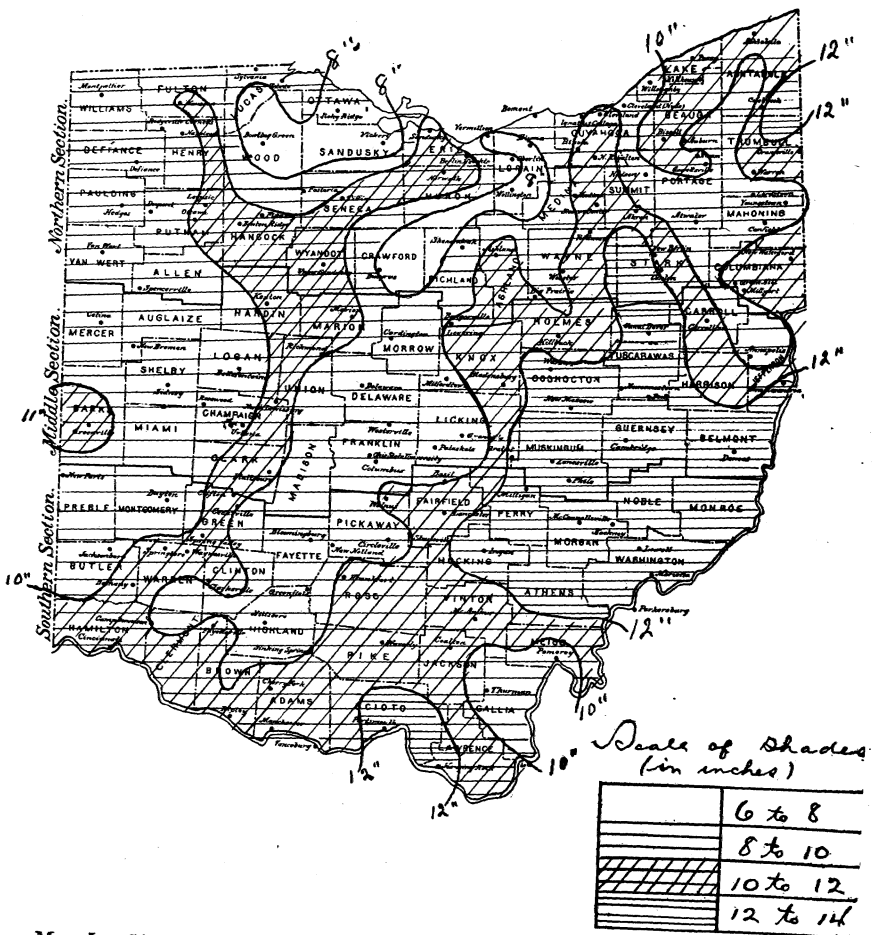



MAP 4. Showing mean or average rainfall in Ohio for fifteen years—June, July and August.

The monthly minimum of rainfall (average) of two inches per month is thought by Dr. McMurtrie to indicate the precipitation limits of successful beet culture. Accepting these for the time, we perceive that Ohio is well favored. In no part of the state is the rainfall normally deficient,

while the isotherm of 70° F. for June, July and August winds tortuously through about as much of Ohio as it can well traverse.

This isothermal of 70° F. passes through the counties of Columbiana, Carroll, Harrison, Jefferson, Belmont, Guernsey, Tuscarawas, Stark, Portage, Summit, Holmes, Knox, Licking, Delaware, Morrow, Richland, Ashland, Wayne, Medina, Cuyahoga, Lorain, Huron, Erie, Lucas, Fulton, Henry, Defiance, Williams and Paulding.

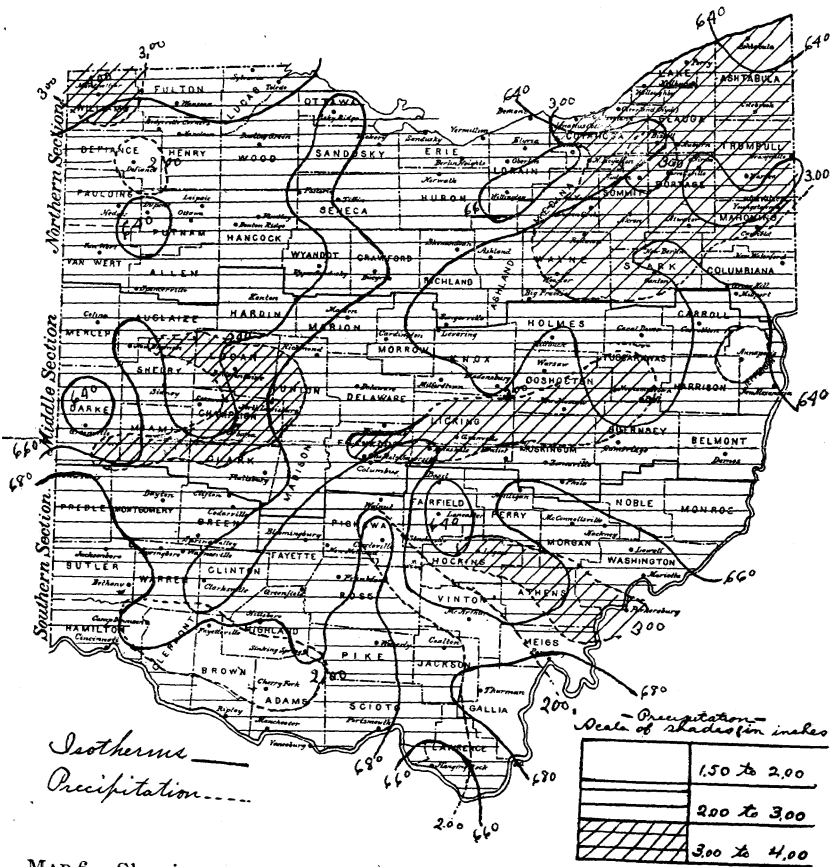



MAP 5. Showing mean or average rainfall in Ohio for fifteen years—June, July, August and September.

In Table II these counties are represented by averages of 279 samples of sugar beets. The mean of all these analyses is 17.9 per cent solids, 14.3 per cent sucrose in juice and a purity coefficient of 80.

The isothermal of 72° F. mean summer temperature passes through the counties of Washington, Noble, Muskingum, Perry, Morgan, Athens, Vinton, Hocking, Fairfield, Franklin, Pickaway, Fayette, Clinton,

Greene, Clarke, Union, Marion, Crawford, Wyandot, Hancock, Seneca, Sandusky, Ottawa, Wood, Hardin, Logan, Champaign, Miami, Shelby, Auglaize and Mercer. In the same table these counties are represented by 143 samples of beets. The mean of these analysis is 17.9 per cent solids, 13.9 per cent. sucrose and a purity of 77.7.




MAP 6. Showing mean or average rainfall and isotherms in Ohio for fifteen years—September.

Should we omit Ottawa for which there may be some good claim, the average falls slightly lower. This difference in purity is the significant feature of these summaries. While it is not claimed that the one particular series of counties is favored above the other, the results have been collected to determine the effect of climatic conditions. Since the districts traversed by the isothermal of 70° are likewise those in which great interest has been taken in sugar beet culture and from which a large number of samples have been received we are best prepared to form judgment upon their advantages.

Those districts showing an average sucrose per cent. of 13 and above and a purity coefficient of 78 or more will probably offer more favorable conditions for factory establishment than those which fall below these limits.

## THE QUESTION OF BEET SUGAR FACTORIES.

It was pointed out in Bulletin 75, of this Station, that modern beet sugar factories are generally large enterprises and that the tendency is decidedly to enlarge them rather than to build smaller ones. The contemplated enterprises are on the basis of a capacity of 300 tons of beets per day of twenty-four hours. Such a factory will cost about $250,000 to construct and to house it. When all items of cost are included and allowance made for the large working capital required, the total capital necessary, reaches $400,000 to $500,000. This amount will scarcely be invested without full assurance of an adequate supply of good beets.

The amount of beets required for such a factory needs also to be considered. The working season for Ohio will begin, according to the analyses, Table III, from September 20th to October 1st. This will give about 60 days' run before storing and pitting will usually be necessary. By pitting or siloing, as it is usually called, the working period may be extended perhaps sixty days more, certainly 30 to 40 days, thus giving a working season of about 100 days. This length of working period means the consumption of 28,000 to 30,000 tons of beets. Allowing 12 tons per acre as an average yield, and this is higher rather than lower than the average from so large an acreage is likely to be, we find that this tonnage will require the cultivation of sugar beets upon 2,350 to 2,500 acres of land. Such an acreage means with us that several hundred farmers must undertake sugar beet culture for a period of years, since factory promoters commonly propose a five-year guarantee. The undertaking is a large one from whichever side it is viewed, so that precipitancy in its beginning can scarcely yield good results. There must be met, likewise, the other conditions essential to factory location, namely: fuel, water and limestone supplies combined with transportation facilities. In Nebraska we are informed that portions of the beets are drawn from points 25 to 80 miles from the factory, the freight per ton being in such cases 50 cents for 25 miles or less; 30 cents for 25 to 45 miles, and 80 cents per ton for 45 to 100 miles. The making of such a freight rate in car loads for these distances is a matter upon which our railways will decide. The cost of shipment appears to be the only limit to the distance from the factory, when direct transportation may be had. Certainly the now almost abandoned canals of Ohio pass through some excellent sugar beet districts in this State. The canals likewise offer a supply of water for many of the uses of the proposed factories

## GROWERS' GUARANTEES OF BEET SUPPLIES.

The usual form of contract between the growers and the beet sugar factory stipulates that the former undertakes to cultivate under direction for a term of years—usually three to five years—a specified number of acres of sugar beets and to deliver the crop to the factory. The growers commonly are paid by one of two general plans, namely: at a graded price per ton for the beets delivered, or at a flat (fixed) price per ton for the beets at the factory. To insure a proper seed supply the factory furnishes the seed to the growers at about cost. There is at present in California a spirited discussion of the relative merits of the "graded price" contracts and the "flat price" system. In the former a standard price of $3.50 to $4.50 per ton —usually about $4.00—is given for beets having 12 per cent. of sugar in beet (12.6 per cent. in juice) and a purity of 80; in addition there is paid about 25 cents per ton more for each 1 per cent. of sugar above say 13 per cent. provided the purity does not fall below 78 or 80. This method offers a reward for growing beets of superior quality and is an incentive to good growing. Were there no factors beyond the control of the grower it might be the best form of contract. But it is clear that the factory may reserve the authority to direct the delivery of beets at a stated time, which must be that at which the beets may be used. Should this time not coincide with the date of highest sugar content in the beets, manifestly the grower may not receive the reward for which he has earnestly labored. In case the beets are pitted by the grower for a given compensation per ton, delivery may not be required until near the close of the working season, when the beets shall have greatly depreciated in quality and therefore by this system, in value.

It is claimed by the advocates of the "flat price" contract that, since the beets are grown under constant direction by the factory representatives and delivered when ordered by them, the responsibility of the grower for the quality of the beets is less than that of the factory. And especially when the factory orders delivery at some other date than that of full maturity of the beet, it is beyond the power of the grower to secure a reward for superior quality even when grown. Such, therefore, hold that a fixed price per ton for properly grown beets is the only equitable basis of contract.

It is claimed further that the older factories, notably that of Alvarado where the graded price was first tried, found themselves in a constant broil with the growers while that system was retained; accordingly a fixed or flat price per ton has been latterly adopted to the mutual satisfaction of factory and growers. Whatever the form of contract agreed upon there can be no successful beet sugar factories without full compliance by both parties. Reliable capitalists must demand a sufficient guarantee of beet supply before they dare invest in so large an undertaking as a modern factory for beet sugar manufacture. The farmer must also protect his own interests by as full knowledge as possible.

The Experiment Station stands committed to use its best efforts in behalf of this new branch of industry in any part of Ohio. Advice and information will at all times be cheerfully and freely given.

## GENERAL SUGGESTIONS FOR SUGAR BEET EXPERIMENTS IN OHIO.

A few parts of the State have sufficently tested sugar beet culture to warrant a belief in their adaption to this new industry. There are none, however, in which enough has been done to make a final judgment possible. The farmers need more experience in growing beets and upon a larger scale than in this year's trials. While small areas are of great value, larger ones give much more reliable data in the hands of the farmer. The cost of growing, distance to plant, methods of seeding, culture and manuring are all worthy of the Ohio grower's best efforts.

To the end that we may secure, more complete information and wider experience in Ohio sugar beet culture, there should be larger effort in this line in 1898. The National Secretary of Agriculture has already assured the Director of this Station that he will have an ample supply of the best sugar beet seed obtainable, with which to continue the investigations of the past year in 1898.

## CULTURAL SUGGESTIONS.

Many of the samples analyzed in 1897 were of too great size and many were badly grown as well. To be able to show the best results an effort should be made to realize sugar beet ideals, or a fair yield of long, conical sugar beets weighing from one to three pounds (450 to 1,350 grammes). These beets need to be grown on soil of sufficient depth to permit of their full development without protruding from the earth. Typical beets of these sizes and of the Klein Wanzlebener variety will usually measure 12 to 15 inches in length. Unless the land has a very porous subsoil, therefore, it will be necessary to prepare it by subsoil plowing or its equivalent. Rather early spring plowing is thought to be good. To plant beets, which as seedlings are weak and easily crowded out, except in a thoroughly prepared seed bed is to invite difficulty or disaster. A clover sod is well suited to beet growing.

It is to the distance of planting that we must look to avoid overgrown beets. The seed should be planted close enough that the crowding of the plants will keep the size of the beets within limits. Hand cultivation, except when absolutely necessary to keep the weeds down or to thin the beets, is not advisable for Ohio. The rows should, however, be just as close together as horse cultivation will admit, say 20 to 24 inches apart. The stand of beets in these rows will influence the size very greatly. For loamy or loose soils the beets may be grown from 5 to 6 inches apart in the row; in clay land a slightly greater distance may be advisable, though it should not greatly exceed 6 inches, to produce rich beets. The methods of planting, thinning, harvesting, etc., ar

discussed in Bulletin 75, pp. 23–4. There seems to be no reason for going over this part here. The suggestions as to distance are, however, of vital importance if we are to get a correct estimate of what Ohio soils can do in the production of rich sugar beets. These beets will not give the highest per cent. of sugar when grown after methods of planting, usually followed with mangolds, and with the larger part of the beet protruding above the ground. Thorough shallow cultivation is needed for best results.

There is danger in expecting too much in the way of yields of sugar beets in Ohio. The probable yields of well grown beets may not be expected greatly to exceed 16 to 18 tons per acre, while the average is more likely to fall below than to exceed 12 tons per acre. Indeed, 10 tons will be a fair average, taking a large number of growers and a variety of soils into consideration. Plots of several rows are to be recommended over those of a few rows only. In the former the field conditions of crowding may be realized more nearly.

### MATURITY OF SUGAR BEETS IN OHIO.

As shown by Table III, the earliest date at which Ohio sugar beets met standard conditions of sugar and purity was September 20th. In general the most mature beets were not ready for manufacture or for test before October 1st, the larger portion of them matured after October 15th. It is therefore needless to send beets earlier than about October 15th. From that date until actual freezing of the earth occurs, the beets will be in condition to sample and to send to the Experiment Station. Our preference is still for many samples to be sent in one box as by freight. The beets arrive in good condition when sent in this manner.

### CULTURAL DATA CONCERNING SUGAR BEETS.

In next year's investigations it is hoped to secure fuller data than has been returned during the past season. It is the intention to send circulars of instruction at the time the packages of beet seed are distributed. Growers may thus learn what notes are expected, and make the entries while fresh in mind. The earnest co-operation of Ohio farmers is solicited for the future investigations of this new industry in our State.

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